Software Description

AC500

Scalable PLC
for Individual Automation

Fieldbus Configurator
SYCON.net

SYCON.net

netDevice

DTM for PROFIBUS DP Master Devices

Generic DTM for PROFIBUS DP Slave Devices

ComPro DTM / Ethernet

Ethernet Device Configuration

DTM for CANopen Master Devices

Generic DTM for CANopen Slave Devices

DTM for DeviceNet Master Devices

Generic DTM for DeviceNet Slave Devices

ODMV3 Tray Application

ODMV3 Diagnostics Application

netConnect Connection Tool

Operating Instruction Manual

SYCON.net

Frame Application

Edition: 3
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ABB STOTZ-KONTAKT GmbH
Eppelheimer Straße 82
D-69123 Heidelberg
Germany

Tel.: +49(0)6221/701-0

Hotline Tel.: +49(0)6221/701-1444
Hotline Fax: +49(0)6221/701-1382

Email Hotline: Desst.helpline@de.abb.com

Web: www.abb.de/sto

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3	02.06.05	1.0.2.2 Syconu.exe	3.1	SYCON.net only with administrator authorization

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1 Introduction

1.1 Short Description SYCON.net

SYCON.net is a FDT frame application to configure communication-capable fieldbus devices of different manufacturers in one project.

In accordance with the FDT Specification 1.2 (Field Device Tool Specification) SYCON.net is used as a frame application for DTMs (Device Type Manager), which are provided, as configuration software by the field device manufacturers.

Via the communication channel (Master DTM) the communication with the field devices using protocols like the PROFIBUS is set up.

1.2 System Requirements

- PC with 1 GHz processor or higher
- Windows 2000/XP
- Internet Explorer 5.5 or higher
- Free disk space: min. 20 - 30 MByte
- CD ROM drive
- RAM: min. 256 MByte
- Graphic resolution: min. 800 x 600 pixel
- Keyboard and Mouse

Note: If the project file is saved and opened again or it is used on another PC, the system requirements need to match. Particularly the DTMs need to be installed on the used PC.

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2 SYCON.net Windows and Menus

2.1 Output Window

The **Output Window** contains index cards, which indicate

- information,
- warnings and
- error messages

in plain text.

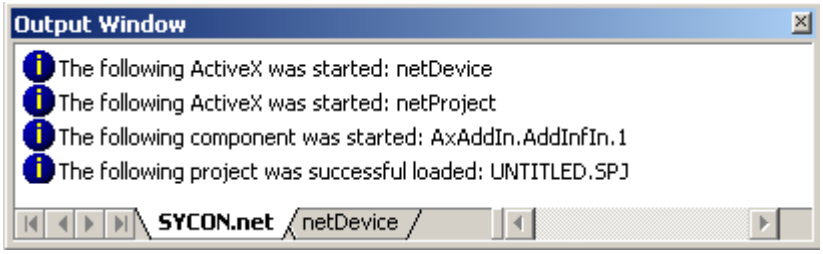
Output Window
The following ActiveX was started: netDevice
The following ActiveX was started: netProject
The following component was started: AxAddIn.AddInfIn.1
The following project was successful loaded: UNTITLED.SPJ
SYCON.net
netDevice

Figure 1: Output Window

2.2 The Menu Bar

The menu bar of the configuration software SYCON.net contains pull down menus, via which all available program functions can be called up.

Figure 2: Menu bar

Note: The two menus **Device** and **Network** are not a function of the frame application SYCON.net, but dynamic menus of the FDT of container netDevice. That means these menus are only faded in the menu bar, if the windows **netProject** or **netDevice** of the FDT container are activated.

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2.2.1 File

The **File** menu contains functions for working on projects.

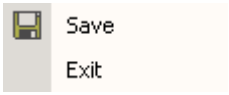

Figure 3: Menu File

Menu	Meaning
Save	Saves the actual configuration.
Exit	Closes the program. If changes of the project file are not stored yet, a dialog appears which requests the user to save the project before ending.

Table 1: Menu File

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2.2.2 View

SYCON.net offers several possibilities for the arrangement and representation of the projects. In the menu **View** the individual tool bars and windows can be faded in and/or out.

Actual indicated tool bars and/or windows are marked in the **View** menu by a checkmark.

Note: The representation in the menu **View** is dynamic. That means it depends on the components which were installed during installation.

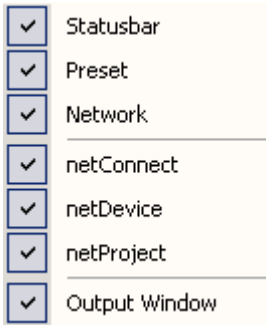

Figure 4: Menu View

Menu	Meaning
Statusbar	Fade in and out Statusbar.
Preset	Fade in and out toolbar for different representations of the project.
Network	Fade in and out Network toolbar.
netConnect	Fade in and out **netConnect** window.
netDevice	Fade in and out **netDevice** window.
netProject	Fade in and out **netProject** window.
Output Message	Fade in and out **Output** window.

Table 2: Menu View

A detailed description about the toolbars can be found in section *Toolbars* on page *10*.

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2.2.2.1 Toolbars

Frequently used menu functions are united in toolbars:

- **Preset Toolbar**

  The **Preset** toolbar gives the possibility to call up to four different representations variants for a project.

  The respective representation is always stored in the active view. The last representation in the respective view is called up by selecting another representation.

Figure 5: Preset Toolbar

- **Further Toolbars**

  It is possible that toolbars from further installed components are displayed in SYCON.net.

  For example SYCON.net indicates a network toolbar, which is faded in and/or faded out with the menu **View > Network**, if the netDevice component is installed.

  This toolbar contains the functions

  - **Network > Add busline,**
  - **Network > Delete last busline** and
  - **Network > Load Device Catalog**

  (from left to the right).

Figure 6: Network Toolbar

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2.2.3 Help

The menu **Help** contains both the documentation about the frame application as well as general information about the software and a reference to the homepage of the manufacturer.

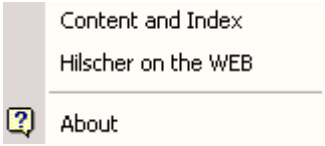

Figure 7: Menu Help

Menu	Meaning
Content and Index	Opens the documentation of SYCON.net.
Hilscher on the WEB	Opens the web page of the company Hilscher GmbH. Therefore an existing internet connection is necessary.
About	Information about the program version.

Table 3: Menu Help

About

Shows the version of SYCON.net.

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3 Working with SYCON.net

3.1 Start Program

The configuration software **SYCON.net** is started from CoDeSys.

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3.2 Save Projects

Via the menu **File > Save** a project can be saved.

If the program is exit and the current configuration does not agree with the last saved configuration, the following question appears:

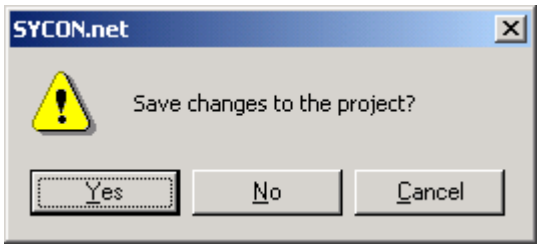

Figure 8: Security Question - Save Project

If you answer this question with **Yes**, the project data are stored. If you answer this question with **No**, the changed project data are rejected.

The saving procedure is aborted by clicking the **Chancel** button and the project data is not stored.

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5 Glossary

DTM

Device Type Manager

A DTM is a software component that serves the Configuration and configuration of field devices. The DTM may have a graphical interface. A DTM that was developed in accordance with the FDT-specification may be integrated into Engineering Tools, Control Systems or configuration software like SYCON.net.

The PNO Guideline 2.162 provides a Styleguide describing the design of a DTM.

FDT

Field Device Tool

The FDT Specification (PNO Guideline 2.162) describes how a DTM communicates with a frame application. All the interfaces between a DTM and a frame application are detailed.

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Operating Instruction Manual

netDevice

FDT Container

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ABB STOTZ-KONTAKT GmbH
Eppelheimer Straße 82
D-69123 Heidelberg
Germany

Tel.: +49(0)6221/701-0

Hotline Tel.: +49(0)6221/701-1444
Hotline Fax: +49(0)6221/701-1382

Email Hotline: Desst.helpline@de.abb.com

Web: www.abb.de/sto

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1 Introduction

1.1 Short Description netDevice

netDevice is a **FDT Container** for the configuration of field devices of different manufacturers within a FDT frame application.

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2 netDevice Windows

2.1 netDevice

The **netDevice** window is divided in two different areas:

- **netDevice - Graphical Network View**

  On the left side of the **netDevice** window the actual configuration is shown as graphical network view. A detailed description of the network view you find in section *netDevice - Graphical Network View* on page *7*.

- **netDevice - Device Catalog**

  On the right side of the **netDevice** window the installed devices are displayed as tree structure. Further information about this you find in section *netDevice - Device Catalog* on page *7*.

2.1.1 netDevice - Graphical Network View

The network view displays the actual project as graphical network structure. Devices can be added by drag and drop from the Device Catalog (see section *Insert Device in Project* on page *18*) and they are displayed as an icon in the network view.

On top or underneath the icon the name of the device with the device address and a continuous number for master devices is displayed. The position of the text depends on the direction of the connection line.

By a right mouse click on a device symbol, the context menu is opened. It contains all functions like the menu device which is callable over the menu bar and possibly still further functions for configuration and diagnostic. A detailed description about the device menu and the context menu you find in section *Device* on page *11*.

The configuration dialog of the appropriate device opens via a double click on a device symbol. Here all device and bus-specific settings can be made. The possibilities of the configuration are manufacturer specific, closer information for device configuration can be taken from the technical manual of the manufacturer.

The single elements (devices and bus lines) can be arranged in the graphical network view. More information can be found in section *Arrange Elements in the Graphical Network View* on page *21*.

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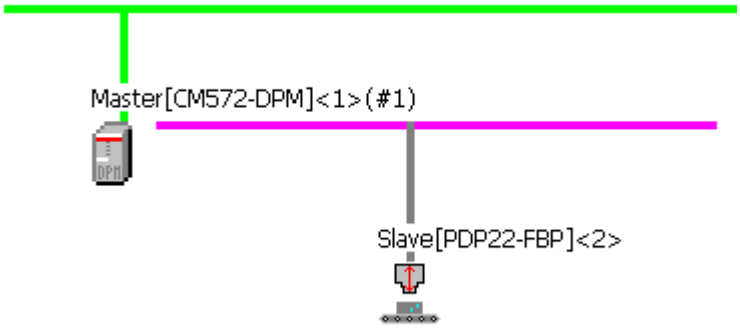

Figure 1: netDevice - Graphical Network View

The graphical network view in the netDevice window is synchronized with the netProject window. That means devices which are inserting in the graphical network view, are also displayed automatically in the netProject window. Also the devices which are inserting in the netProject window are shown in the graphical network view of the netDevice window.

Representation of the Device Description

The device description is composed as follows:

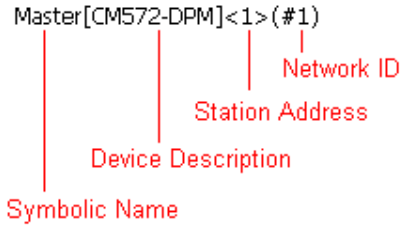

Figure 2: Representation of the device description

The **Symbolic Name** is entered over the context menu of the device and is optional. Further information about this you find in section *Change Symbolic Name* on page *13*.

The **Device Description** is the name of the device and is not editable.

The **Station Address** is the device address on the bus and can be changed in the device settings.

The **Network ID** is the network address of the Master and it is provided automatically when inserting the device. The network ID is static and cannot not be changed.

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2.1.2 netDevice - Device Catalog

The Device Catalog displays a list of devices of all DTMs installed on this PC. If the Device Catalog is loaded, it is shown as tree structure in the netDevice window.

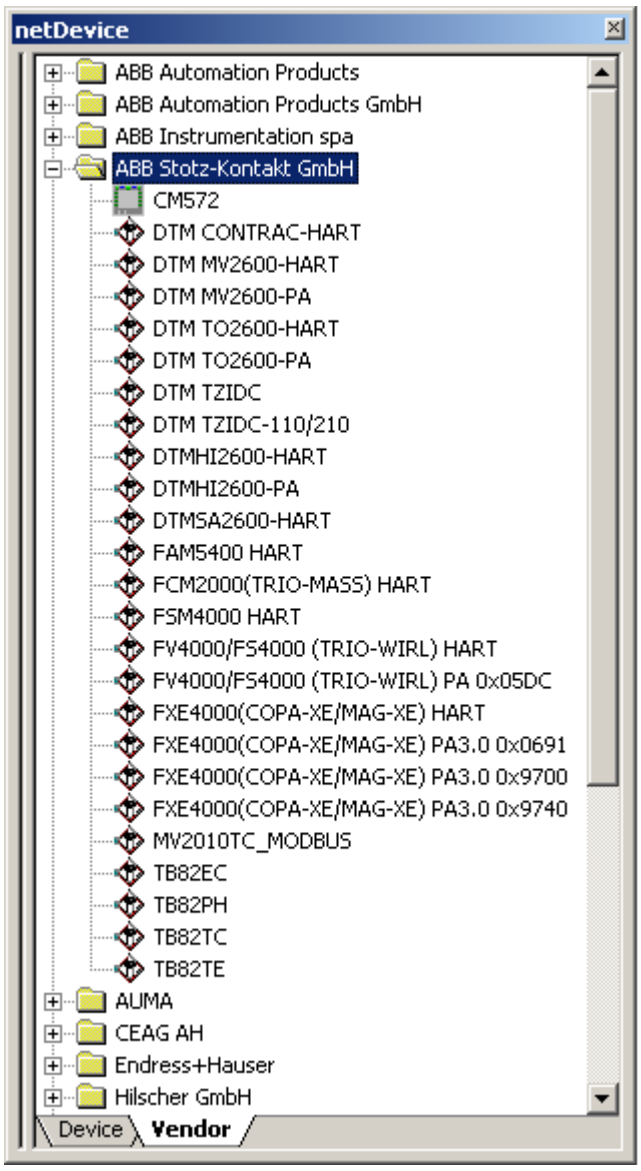

Figure 3: netDevice - Device Catalog

Selecting one of the register cards, the devices can be arranged by **Vendor** or **Device**.

Via drag and drop the devices can be inserting in the graphical network view or in the netProject window. There the devices can be configured.

Further information about working with the Device Catalog you find in section *The Device Catalog* on page *16*.

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2.2 netProject - Network Folder

In the **netProject** the actual configuration is displayed as project tree. The devices can be inserting via drag and drop from the Device Catalog in the netProject window like in the netDevice window. Underneath the device symbol the name of the device and the device address are shown. For Master devices additionally a continuous number is indicated.

The context menu of a device is opened by a right mouse click or a double click on the device. Here the device configuration can be set.

Devices which are inserted in the graphical network view are also displayed in the netProject and the other way, too.

The actual selection is synchronized with the graphical network view. Except of multiselection in netDevice only the first item will be selected in the tree. More about multiselection you find in section *Multiselection* on page *22*.

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3 Working with the Menus

3.1 The Menu Bar

The both menus **Device** and **Network** are dynamic menus of the netDevice FDT Container, which are displayed in the menu bar of the frame application, if one of the windows **netProject** or **netDevice** are activated.

3.2 Device

The menu **Device** includes functions like the device parameter or device properties. This menu can be called up via menu bar of the frame application or via the context menu of the device.

Calling up via	Description
Menu bar	In the menu bar of the frame application the standard device parameters are shown in the **Device** menu. The display of this menu is independent from the used device.
Context menu (Right mouse click on device)	The context menu **Device** contains the two functions **Symbolic Name** and **Delete** device additionally to the functions in the menu bar. A description about this you find in section *Additional Functions in the Context Menu* on page *13*. Further more the context menu can contain additional device parameters, which are not shown in the menu bar. These additional device parameters are manufacturer specific and they are not specified here.

Table 1: Device menu - Calling up via menu bar and context menu of the device

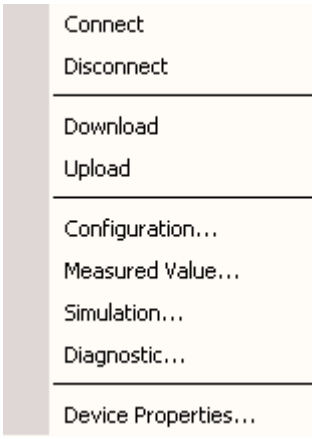

Figure 4: Device menu

In the following table you find a description of the single functions of the **Device menu**. The standard functions, which are displayed in each case, are described:

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Menu	Meaning
Connect (*1)	The menu function **Connect** is available, as long as the device is offline. Selecting the menu **Connect**, a connection to the device is built up and the menu options **Disconnect**, **Download** and **Upload** becoming available now. In case of a Master device, only this device will be connected. If the user connects a Slave device, the device will be connected via the communication channel of the Master. So in this case the Master is online, too. When a connection is built up, the name of the device is displayed on a green background.
Disconnect (*1)	If a device is connected and it should be disconnected, the menu **Disconnect** has to be selected. When a Master is disconnected, the Slaves of this network get also disconnected. The name of the device is displayed without green background, if the device is disconnected.
Download (*1)	With the **Download** menu, the actual configuration is loaded down into this device. A connection to the device is needed to make a download of the configuration.
Upload (*1)	Selecting the **Upload** menu, a configuration stored in this device is loaded up to the application. For this menu it is necessary that a configuration is stored in the device. A connection to the device is needed to make an upload.
Configuration	With the menu **Configuration**, the device parameters of the actual device are displayed. The device parameters are manufacturer specific and cannot be specified here. For further information about the device parameter of the used device look in the documentation of the manufacturer.
Measured Value	Selecting the menu option **Measured Value**, the measurement values of the device is shown. For further information about the measurement look in the documentation of the manufacturer.
Simulation	Selecting **Simulation**, an offline simulation for this device is displayed. For further information about the simulation look in the documentation of the manufacturer.
Diagnostics	With the **Diagnostics** menu, the Diagnostic functions for this device are shown. The diagnostic functions are manufacturer specific. For further information about the device diagnostic look in the documentation of the manufacturer.
Device Properties	Selecting the **Device Properties**, a general device description of the device opens.

Table 2: Menu Device

Note (*1): The functions **Connect**, **Disconnect**, **Download** and **Upload** are selectable for each device. If these menu items are supported by the selected device can only be seen after activating this menu. If they are not supported, an error will be reported.

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3.2.1 Additional Functions in the Context Menu

The context menu of the device is opened by a right mouse click on the device icon. It contains all functions like the **Device** menu in the menu bar. Additionally there are two functions in the context menu:

3.2.1.1 Change Symbolic Name

The device description is shown as name of the device by default. With the function **Symbolic Name** it is possible to insert an own name for the devices additionally to the device description.

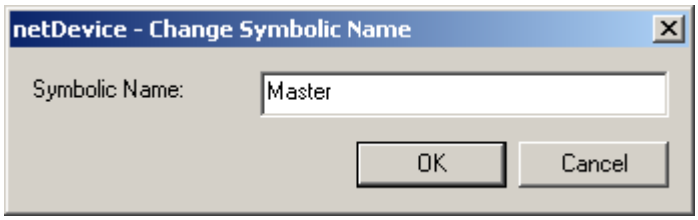

Figure 5: Change Symbolic Name

After entering a symbolic name, this name is shown in the windows **netDevice** and **netProject** as name of the device.

In this case the device description is displayed in squared brackets behind the symbolic name.

Fehler! Unbekanntes Schalterargument.

Figure 6: Symbolic Name changed

3.2.1.2 Additional Functions

The function **Additional Functions** leads to further submenus.

The function **Offline compare…** or **Online compare…** etc. serves to compare parameters. If this functions are supported and what these functions execute, is described in the corresponding documentation of the manufacturer of the respective DTM.

The function **Device Assignment** allows a device-dependent device assignement during device configuration. Further information on this item you will find in the help of the manufacturer of the DTM.

The dialog **Print > Configuration** allows to open the editor **Project Documentation**. Here data for the master configuation and for the master setup can be printed.

3.2.1.3 Delete

With the delete function a device is removed from the project. For further information see section *Delete Device from Project* on page *19*.

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3.3 Network

The menu **Network** includes the network depending functions **Add/Remove Busline**, the **Device Catalog** and **Print Project Data**.

Note: The menu functions **Add Busline** and **Remove last Busline** are independent from the connected hardware; it affects only the graphical display of the bus created in the netDevice window. It does not effect the real hardware configuration.

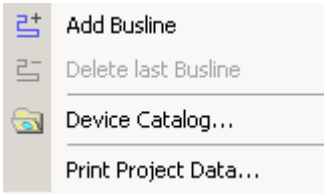

Figure 7: Menu Network

Menu	Meaning
Add Busline	Adds a busline to the selected bus in the netDevice window.
Delete last Busline	Deletes the last busline from the selected bus.
Device Catalog	Selecting the **Device Catalog** function, the window of the Device Catalog opens. The Device Catalog can be loaded or if necessary reloaded. More information about the Device Catalog can be found in section *The Device Catalog* on page *16*.
Print Project Data	With the function Print Project Data the actual project data like project name, the fieldbus command structure and the device parameter are printed out.

Table 3: Menu Network

netDevice Toolbar

The network toolbar is faded in and faded out via the menu **View > Device**.

This toolbar contains the functions

- **Network > Add busline,**
- **Network > Delete last busline** and
- **Network > Load Device Catalog**

(from the left to the right).

Figure 8: netDevice Toolbar

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4 Working with netDevice and netProject

4.1 Getting Started - Configuration Steps

The following table describes the steps to configure a device as it is typical for many cases. It is presupposed that the hardware installation was done.

#	Action	Menu in SYCON.net or in the Host Application	Detail information in section	Page
1	Adding Slave-DTM respectively GSD-Datei	Installing slave DTM respectively copying GSD file in the GSD directory and reloading in SYCON.net via **Network > Device Catalog >** button **Reload**	*Installing Slave DTM and adding* GSD file	*17*
2	Insert Master	Mark Master device in the Device Catalog and insert it via drag and drop in the **netDevice** or **netProject** window	*Insert Device*	*18*
3	Set Master Parameter	Right mouse click on the Master and select **Configuration** from the context menu	Device depending - see help file of the device manufacturer	-
4	Insert Slaves	Mark Slave devices in the Device Catalog, insert them via drag and drop in the netDevice window **on the Master busline** or in the netProject **window on the Master icon**	*Insert Device*	*18*
5	Configure Slaves devices (e.g. Assign the input and output modules)	Make right mouse click on Slave and select **Configuration** from the context menu	Device depending - see help file of the device manufacturer	-
6	Device Assignment	Make right mouse click on the Master and select **Device Assignment** from the context menu of the device	Device depending - see help file of the device manufacturer	-
7	Arrange Project	The Project can be arranged with the mouse in the graphical network view in the **netDevice** window	*Arrange Elements in the Graphical Network View*	*21*
8	Save Project	**File > Save**	-	-
9	Connect Master	Mark the Master, then select **Device > Connect** or make a right mouse click at the Master, then select **Connect** from the context menu of the device.	*Connect/Disconnect Device*	*25*
10	Download	Mark the device and select **Device > Download** or make right mouse click on device and select **Download** from the context menu	*Download to Device*	*26*
11	Diagnostics	Make right mouse click on device and select **Diagnostics** from the context menu of the device	Device depending - see help file of the device manufacturer	-

Table 4: Getting Started - Configuration Steps

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4.2 The Device Catalog

The Device Catalog is a list with all devices of the DTMs, which are installed on the used PC. A DTM represents one or more devices.

Before the devices can be used in the configuration, the DTMs installed on this PC need to be loaded in the Device Catalog. This is done automatically during the first start of the configuration software SYCON.net.

4.2.1 Load Device Catalog

Via the menu **Network > Device Catalog** the device catalog is opened and information like name of the device, bus system, manufacturer and Master channels for the single DTMs are indicated.

If a new DTM is installed, the Device Catalog has to be reloaded, to use the new devices for the configuration. Further information about reloading the Device Catalog you find in section *Reload Device Catalog* on page *17*.

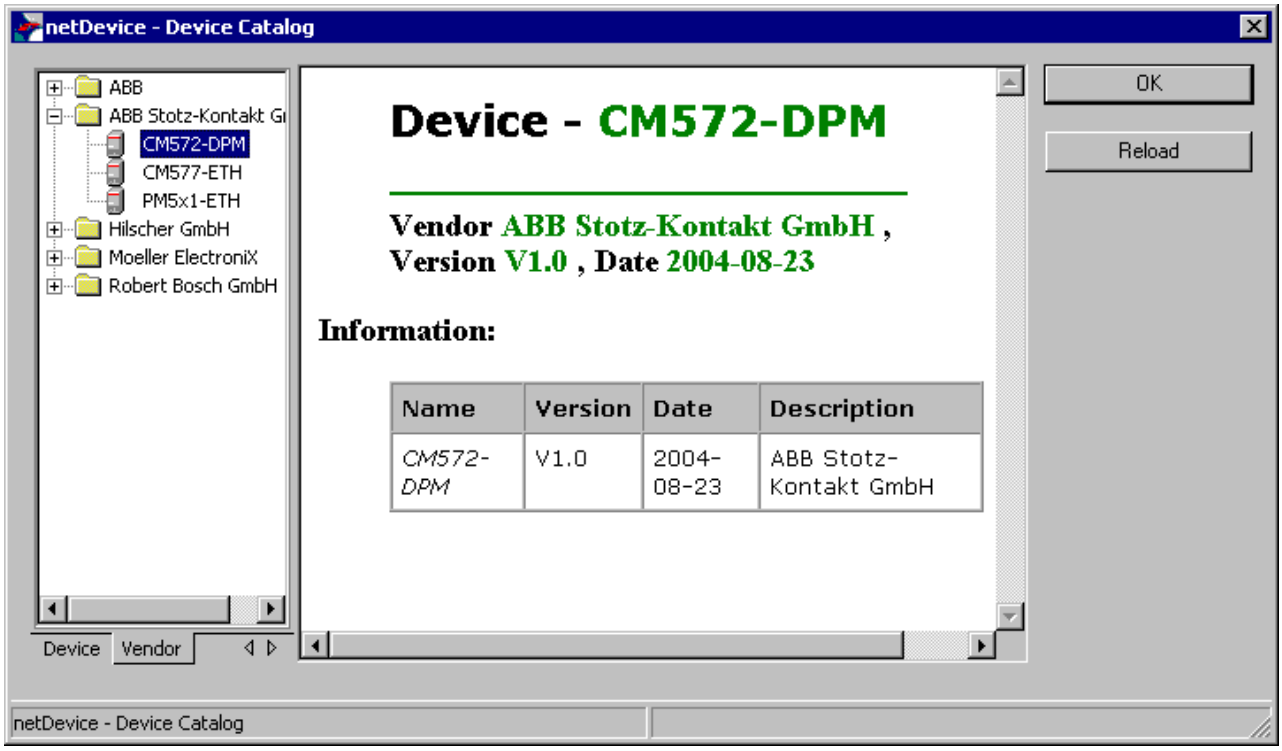

Figure 9: Device Catalog

If the **Device Catalog** is loaded, the installed devices are displayed in the device catalog depiction of the **netDevice** window.

The devices can be inserting in the project via drag and drop either directly from the Device Catalog window or from the **netDevice** window.

A detailed description about the device catalog depiction in the netDevice window you find in section *netDevice - Device Catalog* on page *9*.

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4.2.1.1 Reload Device Catalog

The device catalog has to be reloaded to use the new devices in the configuration, if new DTMs are installed on the PC.

Via the menu **Network > Device Catalog** the Device Catalog opens and selecting the **Reload** button, it is searched for installed DTMs on the PC.

The DTMs are started and some information like device name, bus system, manufacturer, Master channels are read in again when loading the device catalog. With this information SYCON.net recreates the Device Catalog.

The tree structure shows the actual installed devices. Now the devices can be inserted in the project and configured.

4.2.1.2 Installing Slave DTM and adding GSD file

In order to insert further slave devices to the device catalog

1) first it is to be checked, if the slave manufacturer provides a DTM. This DTM is to be installed.

2) If no DTM for the slave is available, the GSD file of the device can be used. Therefore

- SYCON.net is to be quitted.
- The GSD file is to be copied to the directory *C:\Programme\Hilscher GmbH\SYCONnet\ABBPBGenericSlaveDTM\ GSD* by use of the Windows® Explorer.
- SYCON.net is to be restarted.
- The device cataloge is to be loaded (see section *Reload Device Catalog* on page 17).

Note: Before a master or slave device is inserted into a project the GSD file must be copied and reloaded.

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4.3 Insert Device in Project

Devices from the Device Catalog are added by drag and drop in the configuration area. With this action a DTM-Instance will be created.

Note: Only devices with the same Fieldbus system can be connected to the same network.

- **Insert Master**

  To insert a Master device in a project, the Master has to be selected in the Device Catalog directly or in the depiction of the device catalog in the netDevice window. Via drag and drop the device is inserting in the project.

  The device can be inserted in both windows, in the graphical network view of the **netDevice** and in the project tree of the **netProject**. These two windows are synchronized; the device is displayed in both windows.

  Please note:

  In the **netDevice** window the **Master** device has to be inserted on the Root busline (green line). Each insert communication channel has at least one fixed out-bound busline.

  In the **netProject** window the **Master** need to be inserted on the project folder directly.

- **Insert Slave**

  To insert a **Slave** device in a project, the device has to be selected in the Device Catalog directly or in the depiction of the device catalog in the netDevice window. Via drag and drop the device is inserting in the project.

  Please note:

  In the **netDevice** window a **Slave** device only can be inserted directly on the busline which shows graphically the connection to the Master. In case of PROFIBUS this line is colored violet.

  In the **netProject** window the **Slave** device has to be insert on the master icon directly.

Note: The violet busline colour is only for PROFIBUS. In case of other bus systems the buslines can be colored differently.

It is possible to have more than one PROFIBUS network in a project and therefore more than one Master.

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4.4 Delete Device from Project

To remove a device from the configuration, select the device and click on the **Del** button on the keyboard or select **Delete** in the context menu of the device.

Before the device is deleted from the project a security question appears if you are sure to delete this device.

Figure 10: Security Question Delete Device

Note: If a device is deleted, all settings and configurations for this device get lost.

If a communication channel should be deleted that has connected Slaves, another security question appears:

netDevice - Delete Device
The selected device is a Master with connected Slaves.
Do you want to delete the entire Network?
Ja
Nein

Figure 11: Security Question Delete entire Network

Note: If a device is deleted, which has additional devices assigned to; the entire network is also deleted. This might include Gateways with Sub networks.

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4.5 Working with Buslines

4.5.1 Description of the Buslines

- **Busline Colors (default)**

  A **green** colored busline is a Root busline. All Masters are connected to this line.

  A **violet** colored busline shows a PROFIBUS line.

  A **grey** colored busline is a branch line. This is the connection between the Slave device and the busline of the Fieldbus where the Slave is connected to.

Note: In case of other bus systems the busline from the Master to the connected Slaves can have other colors than violet. Violet is only for PROFIBUS. You can drop a Slave or Gateway device to a bus, if it supports the same bus system.

4.5.2 Add / Remove Busline

In the graphical network view in the netDevice window the project can be arranged and edited graphically. That means, buslines can be added and removed.

Note: The changes add / remove busline in the graphical network view have no effect to the real hardware configuration.

- **Add Busline**

  First a busline has to be selected, and then the menu **Network > Add Busline** has to be chosen. A busline is added on the active bus. If more than one bus is selected, the busline is added only at the first selected bus.

- **Remove Busline**

  Selecting a bus and choosing the menu **Network > Remove last Busline** the last busline of this bus is removed. If more than one bus is selected, only the busline of the first bus is deleted.

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4.5.3 Arrange Elements in the Graphical Network View

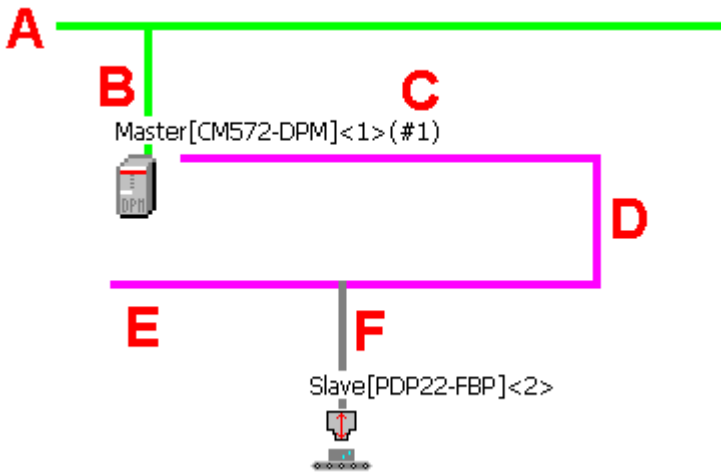

Figure 12: Buslines

Buslines and Device Icons can be selected and moved to arrange them in the graphical configuration.

To move a busline or an icon it is necessary to select it by clicking on it. A selected busline or device is displayed by a blue colored frame around the icon.

- **Move Device Icon**

  Each device icon in the project can be moved by clicking and holding the left mouse button. The fixed buslines move with the icons and the built configuration persists.

  Another possibility to move the device icons is using the cursor keys. If the SHIFT key is pressed, the icons are moved faster.

- **Move Buslines**

  Busline **A** is the **Root Busline** and it can be positioned by holding the mouse button.

  Busline **B** is the **Branch Line** of the Master and can not be moved. If the Master Icon is moved, the busline moves with this icon automatically.

  Busline **C** is the **basic line of the Fieldbus** inherently. It also can not be moved singly, but it is moved with the device icons automatically.

  Busline **D** and **E are variable added buslines** of the Fieldbus. They can be selected and moved or resized.

  Busline **F** is the **branch line of the Slave device**. It is the connection line from the Slave to the bus. This line is moved automatically (like busline B) with the device icon.

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4.5.4 Multiselection

Multiselection makes it possible to select more than one device and/or busline. This is helpful if more than one element should be arranged at the same time. Two possibilities are available for multiselection:

- **Only with the Mouse**

  Click in the configuration window and hold the mouse button and draw a frame around the elements you want to select.

- **With Mouse and the SHIFT Key**

  Select the first element with a left mouse click (busline or device icon) and hold the SHIFT key on the keyboard and click on the next elements you want to select.

Note: Only buslines, which can be changed manually, can be selected. A description of the single buslines you find in section *Arrange Elements in the Graphical Network View* on page *21*.

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5 Configuration

5.1 Online/Offline Configuration

The Configuration of a device is done via the menu **Device** or via the context menu of the device.

A distinction is made between offline Configuration and online Configuration:

- **Offline Parameterizing**

  If a device is parameterized **offline** in the application, the configuration has to be loaded into the device via the download to transfer the parameter data into the device.

  When a configuration already exists in the device, this configuration is overwritten by the download of the new parameter.

  If a parameter data is already stored in the device and has to be loaded into the configuration, you have to make an upload.

- **Online Parameterizing**

  Requirement for the **online** parameterizing is that the hardware is installed and can be activated by the application.

  In case of **online** parameterizing, the parameter data set in the application is transferred into the device automatically without a download. If the device contains parameter data and supports the online parameterizing, the stored parameter data is transferred to the application without an upload from the device.

Note: It is manufacturer specific, if the used device supports an online Configuration. For further information about the used device please ask the hardware manufacturer or see the help file of the device when device dialog is open.

Note: Upload and Download are not available for each device. If a device supports these functions is manufacturer specific. For further information about the used device please ask the hardware manufacturer or see the help file of the device when device dialog is open.

More information about the Download you find in section *Download to Device* on page *26*. More information about the Upload you find in section *Upload from Device* on page *26*.

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5.2 Device Settings and Diagnostics

The device settings and the diagnostic functions of a device can be called up by making a right mouse click on the device or via the menu **Device**.

These two menus can differ, but the functions Connect, Disconnect, Upload and Download are available in both menus, also if the device does not support these functions.

Note: In the menu Device you find the standard parameter and diagnostic functions, which are valid for the most devices. In the context menu of the device you find additional manufacturer specific device settings and diagnostic functions.

The description of the single device parameter and the diagnostic functions can be found in the help file of the device. To call up the help file for an appointed device depends on the installed DTM. Mostly the help file is called up in the opened device dialog with the **Help** button or via the **F1** key on the keyboard.

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5.3 Connect/Disconnect Device

A device can be connected by marking the device and selecting the menu **Device > Connect** or via the context menu of the device and **Connect**.

If a Master is selected and then **Connect**, only the Master device is connected. If **Connect** is selected in case of a marked Slave device, the device is connected via the parent communication channel. That means the Master is connected, too.

Now the device is online. This is displayed by a green background of the device description.

The connection is necessary for functions like the online parameter. More information about the Download you find in section Download to Device on page *26*. More information about the Upload you find in section *Upload from Device* on page *26*.

If the device should be disconnected from the bus, the menu **Device > Disconnect** or the context menu of the device has to be selected and **Disconnect**. In case of a Master the Slaves of this network will be disconnected, too.

That means the Master is connected to the bus automatically, if a Slave is connected; and the Slaves are automatically disconnected, if the Master is disconnected.

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5.3.1 Download to Device

Note: It is manufacturer depending if the device supports the **Download** function. Look up in the manufacturer specific manual for further information.

If a device is parameterized in the application program, a download to the device has to be made to transfer the configuration with the parameter data to the device.

Note: Before a download can be done a connection to the device has to be built up. This can be done via the menu **Device > Connect** or via the context menu of the device and the menu point **Connect**. Therefore see also section *Connect/Disconnect Device* on page *25*.

The download is made via the menu **Device > Download** or via the context menu of the device and then **Download**.

Now the actual configuration in the application program is loaded down into the device.

5.3.2 Upload from Device

Note: It is manufacturer depending if the device supports the **Upload** function. Look up in the manufacturer specific manual for further information.

If a device contains parameter data and this parameter data should be loaded into the application program, an upload from the device has to be made.

Note: You first have to build a connection to the device via the menu **Device > Connect** or via a right mouse click on the device and selecting the menu **Connect**. Therefore see also section *Connect/Disconnect Device* on page *25*.

Then you have to select the menu **Device > Upload** to make an Upload from the device. The actual configuration in the device is loaded into the application program.

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7 Glossary

Master

Master devices determine the data traffic on the bus. A master may send messages without external request, if it is in the possession of the token (bus access authorization).

Slave

Slave devices are peripheral devices, like for example I/O devices or drives. Slave devices are also called passive participants. They do not receive the bus access authorization. That means, they may only accept received messages from the Master or send a message to the Master after enquiry of the Master.

DTM

Device Type Manager

A DTM is a software component that serves the Configuration and configuration of field devices. The DTM may have a graphical interface. A DTM that was developed in accordance with the FDT-specification may be integrated into Engineering Tools, Control Systems or configuration software like SYCON.net.

The PNO Guideline 2.162 provides a Styleguide describing the design of a DTM.

FDT

Field Device Tool

The FDT Specification (PNO Guideline 2.162) describes how a DTM communicates with a frame application. All the interfaces between a DTM and a frame application are detailed.

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Operating Instruction Manual

DTM for ABB-PROFIBUS Master Devices

Configure ABB Master Devices

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ABB STOTZ-KONTAKT GmbH
Eppelheimer Straße 82
D-69123 Heidelberg
Deutschland

Tel.: +49 (0) 6221/701-0

Hotline Tel.: +49 (0) 6221/701-1444
Hotline Fax: +49 (0) 6221/701-1382

Email Hotline: Desst.helpline@de.abb.com

Web: www.abb.de/sto

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Although this program has been developed with great care and intensively tested, ABB STOTZ-KONTAKT GmbH cannot guarantee the suitability of this program for any purpose not confirmed by us in writing.

Guarantee claims shall be limited to the right to require rectification. Liability for any damages which may have arisen from the use of this program or its documentation shall be limited to cases of intent.

We reserve the right to modify our products and their specifications at any time in as far as this contribute to technical progress. The version of the manual supplied with the program applies.

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1 Introduction

1.1 About PROFIBUS Master DTM

In this manual the usage of the ABB PROFIBUS Master DTM is described. This DTM is used for the configuration of ABB PROFIBUS-DP Master devices within a FDT Framework.

This manual describes the device parameters and diagnostic functions.

1.2 Requirements

System Requirements

- Windows® 2000/ Windows® XP
- CD ROM drive
- Graphic resolution: min. 1024 x 768 pixel
- Keyboard and Mouse

Requirements ABB PROFIBUS Master DTM

To configure an ABB PROFIBUS Master device with a DTM the following requirements have to be accomplished:

- Completed hardware installation of a DTM-compatible ABB PROFIBUS Master device
- FDT/DTM V 1.20 compliant frame application
- Installed FDT Framework
- Open Project in FDT Framework
- Loaded DTM in the Device Catalog of the FTD Framework

1.3 Dialog Structure of the PROFIBUS Master DTM

The dialog window of the DTM is divided in three different areas:

- A header which contains the **General Device Information**.
- The **Pages Tree-View** displayed as tree structure.
- The **Setting, Configuration and Diagnosis Pages**.

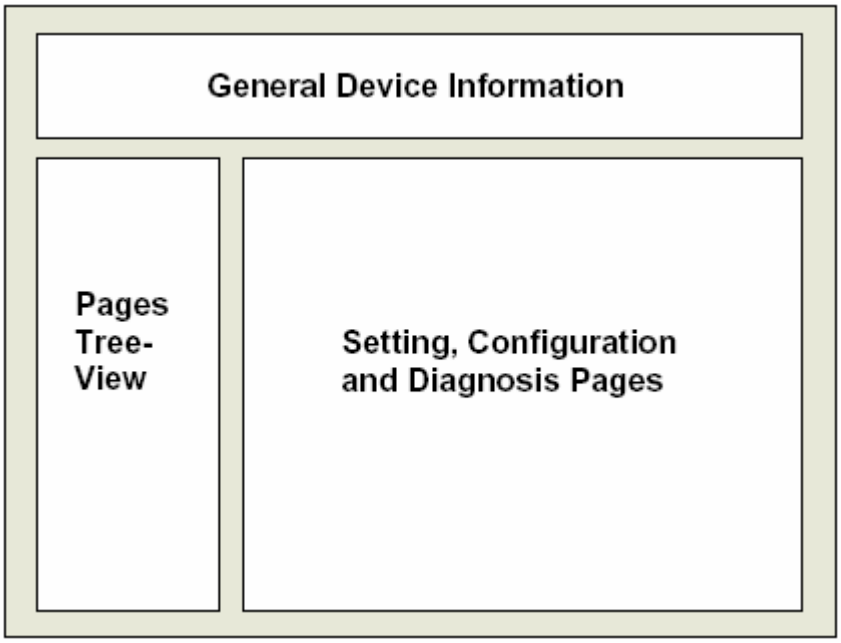


Figure 1: Dialog Structure of PROFIBUS Master DTM

1.3.1 General Device Information

The general device information contains specifications to the device. This indication is only for information and can not be edited

The indicated information is **IO Device** (name of the device), the **Vendor**, the **Device ID** and the **Vendor ID**.

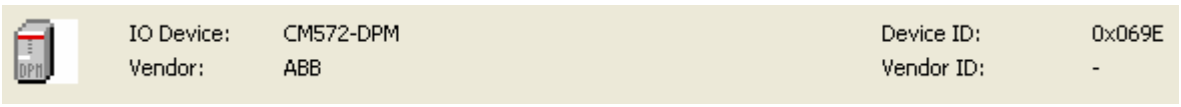


Figure 2: General Device Information

1.3.2 Pages Tree-View

The left side shows the pages tree-view:

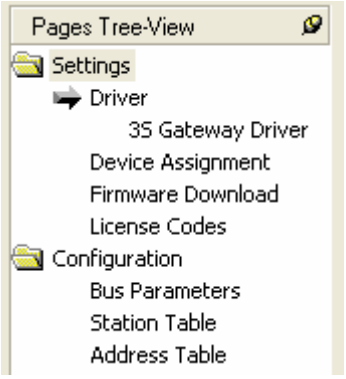


Figure 3: Pages Tree-View Settings and Configuration

Settings	
Driver	On the page **driver** the selection list of the existing drivers is displayed. For the individual drivers additional parameters can be adjusted if necessary. Further information you find in the section *Driver* on page16.
Device Assignment	This page contains the **Device Assignment**, where the favored driver can be assigned. Further information about this you find in section *Device Assignment* on page 19.
Firmware Download	The dialog on the page **Firmware Download** is used to load a new firmware into the device. A detailed description can be found in section *Firmware Download* on page 21.
License Codes	On the page **License Codes** current device data are displayed and the license code can be entered. Further information to this item you find in the section *License Codes* on page 23.
Configuration	
Bus Parameters	The **Bus Parameters** are the basis of an operating data exchange. Further information about setting the bus parameters are described in section *Bus Parameters* on page *26*.
Station Table	The **station table** displays the list of all configured slave devices. Further information to the station table can be found in the section *Station Table* on page 33.
Address Table	The **Address Table** shows a list of all addresses used in the process data image. Further information about the address table is described in section *Address Table* on page *34*.

Table 1: Overview Settings and Configuration Pages

1.3.3 Setting, Configuration and Diagnosis Pages

On the setting, configuration and diagnosis pages the device specific settings and the configuration can be made. These one can be edited by entering parameter values or via pull-down menus. On the diagnosis pages diagnosis information out of or to the device can be red and displayed. Therefore a connection to the device is required.

Detailed information to the single pages you can find below in this manual. Subsequently the sections with the descriptions to the single setting, configuration and diagnosis pages for the ABB PROFIBUS Master DTM are listed.

Settings

Contents	Page
Overview Settings	*15*
Driver	*16*
Device Assignment	*19*
Firmware Download	*21*
License Codes	*23*

Table 2: Descriptions Setting Pages

Configuration

Contents	Page
Bus Parameters	*26*
Station Table	*33*
Address Table	*34*

Table 3: Descriptions Configuration Pages

Diagnosis

Contents	Page
Overview Diagnosis	*37*
Firmware Diagnosis	*38*
Bus Diagnosis	*39*
Station Diagnosis	*42*

Table 4: Descriptions Diagnosis Pages

Extended Diagnosis

Contents	Page
PLC - Variables	*45*
USR_INTF - Common Variables	*46*
USR_INTF - Running State	*47*
USR_INTF - Global State Field	*48*
USR_INTF - Communication Error	*49*
USR_INTF - Parameter Set List	*50*
USR_INTF - Last Downl.parameter	*50*
USR_INTF - Disconnect Report	*51*
USR_INTF - Diagnostic Report	*52*
FDL - Common Variables	*53*
FDL - Bus Parameters	*54*
FDL - DDLM Request cl.1	*55*
FDL - DDLM Request cl.2	*56*
FDL - FDL request	*57*
FDL - FMA request	*58*
FDL - Data exchange retry	*59*
FDL - DP: activated slave	*60*
FDL - DPV1 requests	*61*

Table 5: Extended Diagnosis Pages

1.4 Status Bar

The Status Bar displays information about the current state of the DTM. The meaning of the icons is explained in the following:

Figure 4: Status Bar

Number	Meaning	
1	Name of the Master DTM manufacturer: ABB Stotz-Kontakt GmbH	
2	Connection State Icon closed = Device is online Icon not closed = Device is offline	
3	Offline data: The displayed data are read out from the configuration file (database).	
	Online data: The displayed data are read out online from the device.	
4	Configuration was changed This symbol indicates, that the configuration was changed and these changes have not been saved until yet. When saving the actual configuration, this symbol expires.	
5	Diagnosis is activated	
6	The status of the device is displayed first as icon (6) and below it is indicated in plain text (7). The following states can appear:	
	Info	
	Warning	
	Error	

Table 6: Elements of the Status Bar

1.5 Dialog Buttons

OK

If it is confirmed with **OK**, the settings are stored and the dialog is closed.

Cancel

Clicking the **Cancel** button it is asked to confirm the loss of all modifications made before. If changes at the configuration were made, a safety inquiry follows whether the changes are to be stored or not. Subsequently, the dialog is closed.

Apply

The modifications are stored temporary to the frame applications database when clicking the **Apply** button. The dialog remains opened.

Reset

By means of the **Reset** button changes in the configuration of the frame application are rejected.

Help

For the configuration and diagnosis of the DTM a help file is available. This is opened by clicking the **Help** button.

Selecting, creating, deleting Table Line

To select a line in a table or to create a new one or to delete one the available arrow buttons can be used.

Button	Meaning
	To select the table's first line use the button **First Line**.
	To select the previous line in the table use the button **Previous Line**.
	To select the next line in the table use the button **Next Line**.
	To select the last line in the table use the button **Last Line**.
	The button **Create a new Line** inserts new lines into the table.
	The button **Delete selected Line** deletes the selected line from the table.

Table 7: Meaning of the Buttons selecting, creating, deleting Table Line

Activating / Deactivating Options

To activate an option set a hook into the checkbox.

To deactivate an option remove the hook from the checkbox.

☑ Activated / ☐ deactivated

2 Settings

2.1 Overview Settings

Pages tree-view **Settings** for the PROFIBUS Master DTM:

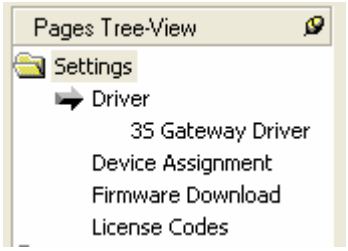


Figure 5: Pages Tree-View - Settings

Descriptions to the setting pages for the PROFIBUS Master DTM:

Driver

Contents	Page
Selecting Driver	*16*
3S Gateway Driver	*17*

Table 8: Setting Pages - Driver

Device Assignment

Contents	Page
Scanning Device	*19*
Assigning Device	*20*

Table 9: Setting Pages - Device Assignment

Firmware Download

Contents	Page
Selecting Firmware	*22*

Table 10: Setting Pages - Firmware Download

License Codes

Contents	Page
License Codes	*23*

Table 11: Setting Pages - License Codes

2.2 Driver

By means of the driver selection it is determined how the PROFIBUS DTM will communicate with the device which will be assigned later by the device assignment (see section *Device Assignment* on page 19).

2.2.1 Selecting Driver

To select one or several drivers select **Settings > Driver** from the Pages Tree-View. The **Driver** dialog with the selection list of the available drivers is shown. Every recognized or installed driver is displayed.

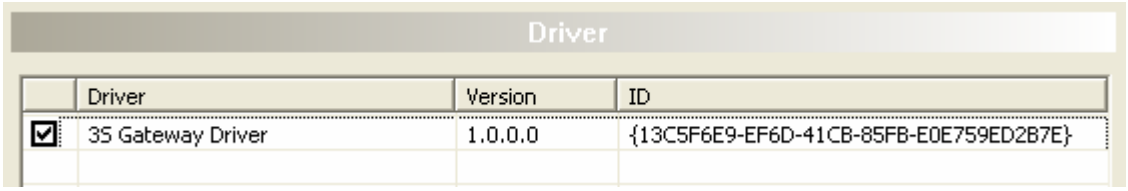


Figure 6: Selection List Driver

Select the driver/s to be used in the dialog **Driver** from the selection list (see figure *Driver Selection List* on page 16).

Only drivers can be selected, the connection specifications of which are supported. Only then a communication between the corresponding master DTM and the device can be established.

Note: In the device assignment (see section *Device Assignment* on page 19) a connection from the master DTM to the device shall be established by trying to scan the selected driver/s.

Checkbox	Description
☐	Driver is not selected.
☑	Driver is selected.

Table 12: Checkbox Driver

Mark the desired driver/s in the driver selection list by clicking the appropriate checkbox.

2.2.2 3S Gateway Driver

In the dialog window *3 S Gateway Driver* settings can be made on how the configurator can communicate with the device.

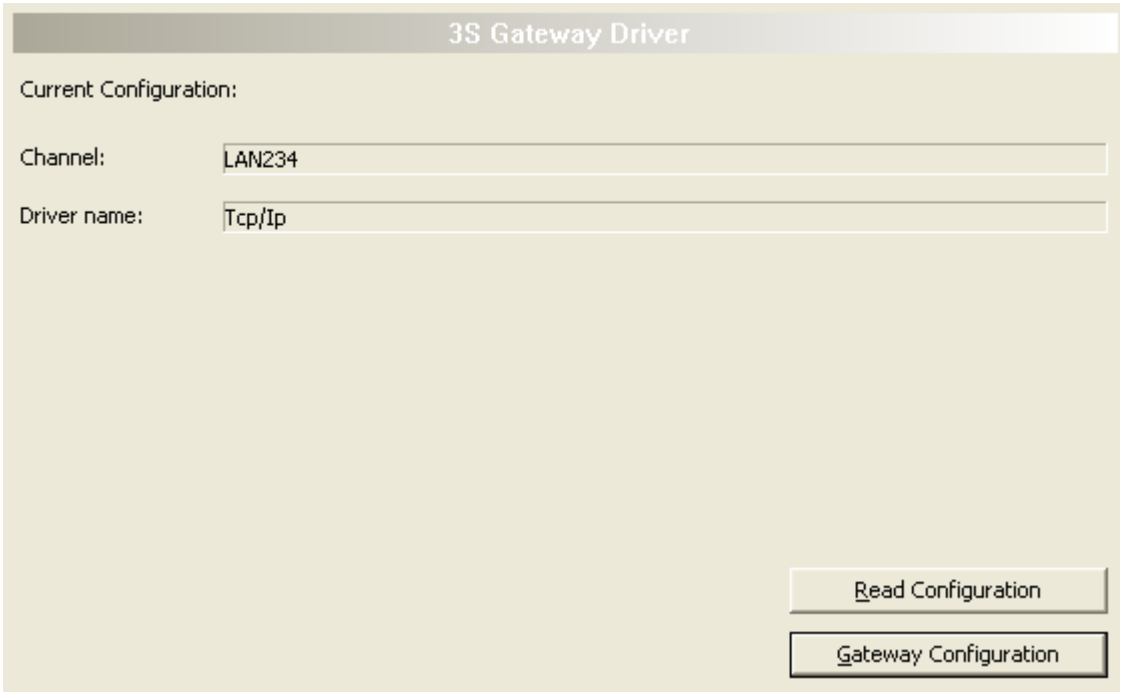


Figure 7: Settings > Driver > 3S Gateway Driver

Term in the dialog	Meaning
Current Configuration	Shows the current configuration of the 3 S Gateway driver.
Read Configuration	Actualizes the display under *Current Configuration*
Gateway Configuration	Opens the window *'Kommunikationsparameter'* (*Communication Parameters*, see figure *3S Gateway Driver - Communication Parameters* on page 18). The communication parameters for the driver configuration can be preset here.

Table 13: Description to the 3S Gateway Driver Dialog

In the window *'Kommunikationsparameter'* the communication parameters for the driver configuration can be adjusted.

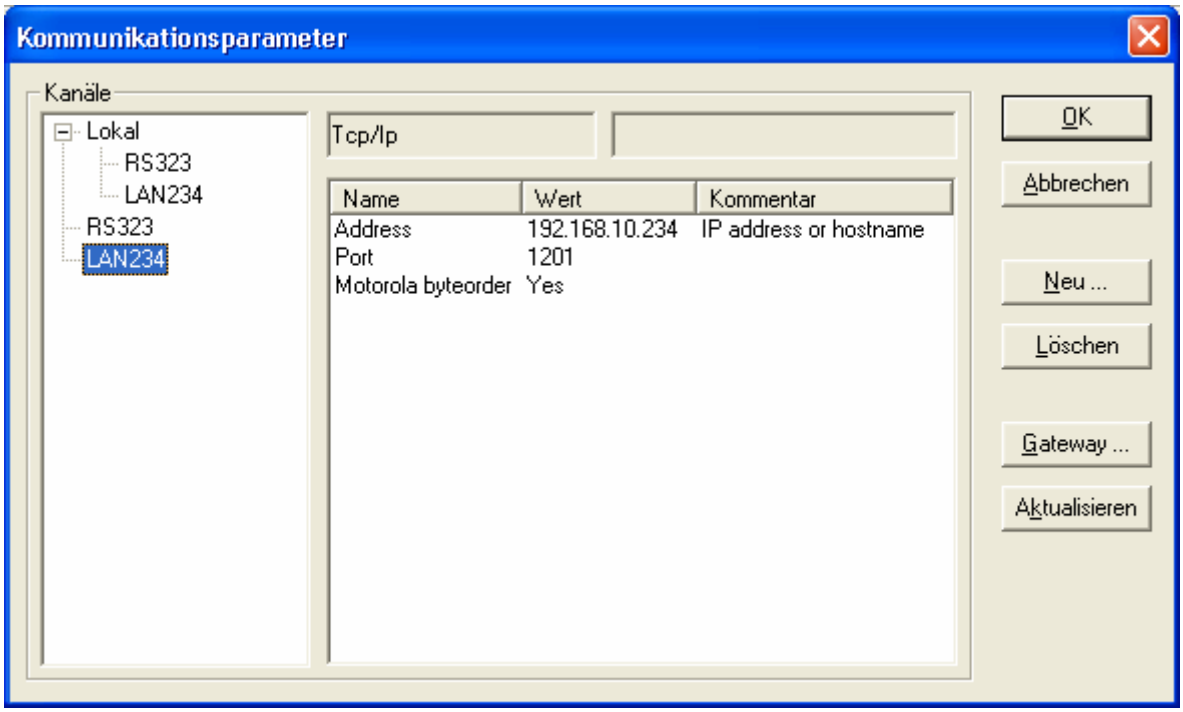


Figure 8: 3S Gateway Driver - Communication Parameters

Note: The detailed description to the dialogue window *Kommunikationsparameter* (communication parameter) is in the ABB manual "Systems Engineering of the CPUs/Coupler".

2.3 Device Assignment

To establish an operating communication between the DTM and a device, a physical device must be assigned to the master DTM. This is done in the **Device Assignment**.

To access the **Device Assignment** dialog, select **Settings > Device Assignment** from the Pages Tree-View. The dialog **Device Assignment** is displayed:

Note: Precondition for the device assignment is the previous selection of one or more drivers (see section *Driver* on page 16).

2.3.1 Scanning Device

To start the scanning process, click to the button **Scan**.

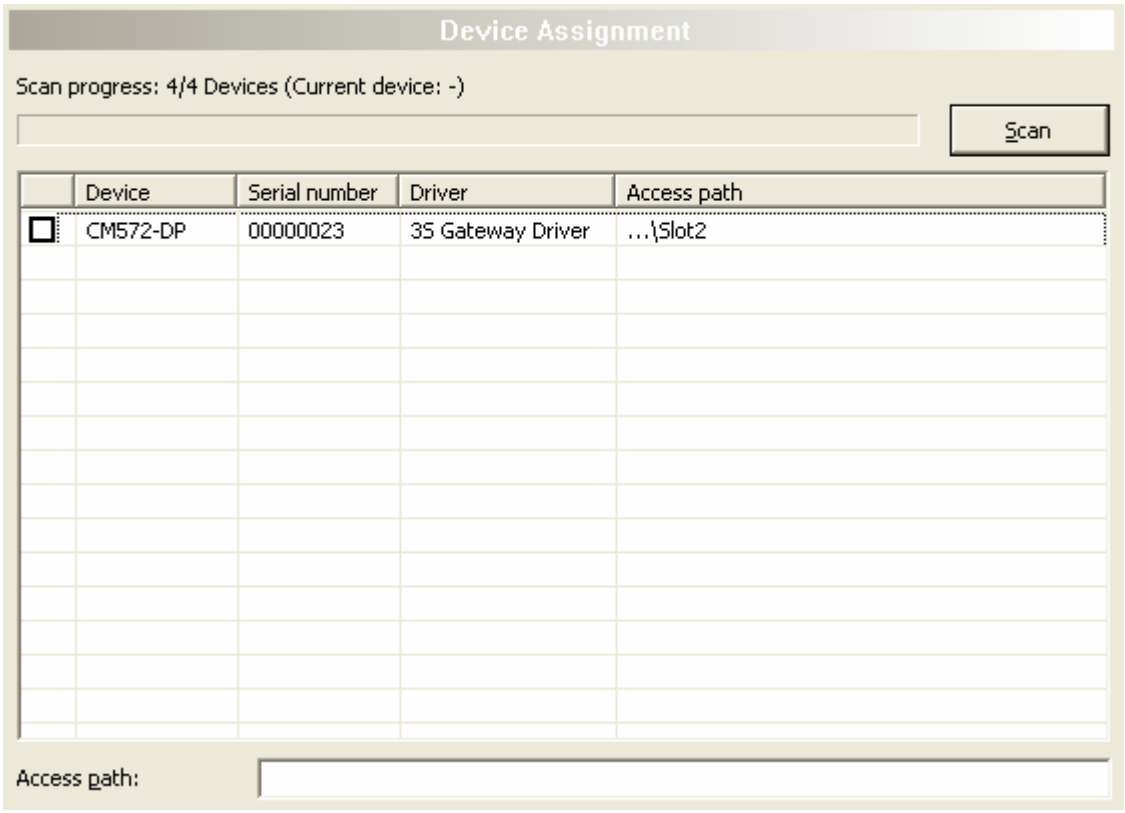


Figure 9: Device Assignment - detected Devices

In the table **Device Assignment** all devices are indicated, which can be connected with the DTM via the drivers selected before.

For every found device the device name, the serial number, the driver and the access path are displayed.

In the field **Access Path** the access path to the selected device is displayed.

2.3.2 Assigning Device

To assign a driver to a device, first the checkbox at the left side of the desired device/ driver must be marked by a hook.

Checkbox	Description
☐	Device is still not assigned.
☑	Device is assigned.

Table 14: Device Assignment - Checkbox Device

Note: A connection can always only be build up to exactly one device.

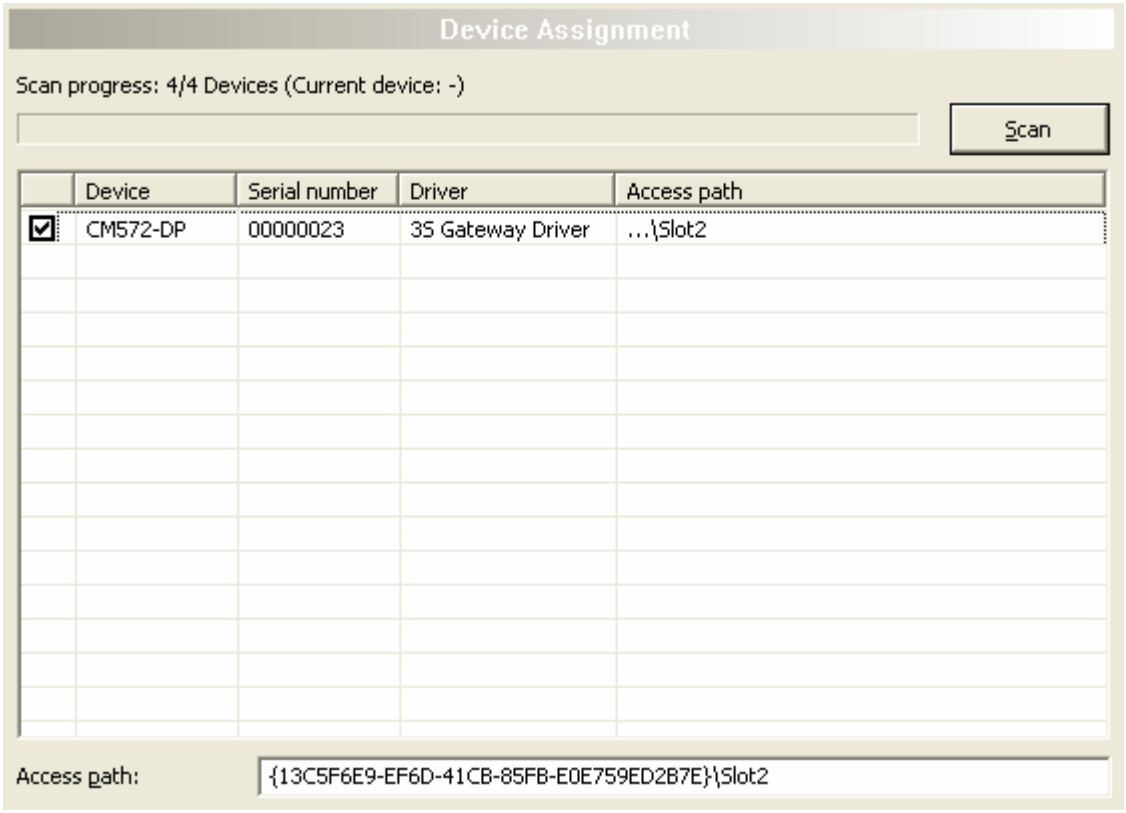


Figure 10: Device Assignment - Assigning Device

Further the selection is to be confirmed by **OK** or **Apply**. Now the selected device is connected with the master DTM.

By clicking to the button **Cancel** the Device Assignment dialog will be closed without any assignment or changes of an assignment.

Note: To analyze errors which have been occurred during assignment, the diagnostic function **ODMV3 Diagnostic Application** can be used (for further information see manual **ODMV3 Diagnostic Application**).

2.4 Firmware Download

Using the **Firmware Download** dialog a firmware can be transferred to the device, to e. g. load a later version. In this case open the **Firmware Download** dialog.

To access the **Firmware Download** dialog, select **Settings > Firmware Download** from the Pages Tree-View. The dialog **Firmware Download** is displayed.

Note: For firmware download a device must be assigned to a driver. See section *Driver* on page 16.

In order to select a firmware file, click on the **Browse** button. The dialog **Select Firmware File** opens, in which the firmware file to be loaded can be selected. A description about this dialog you find in section *Selecting Firmware* on page *22*.

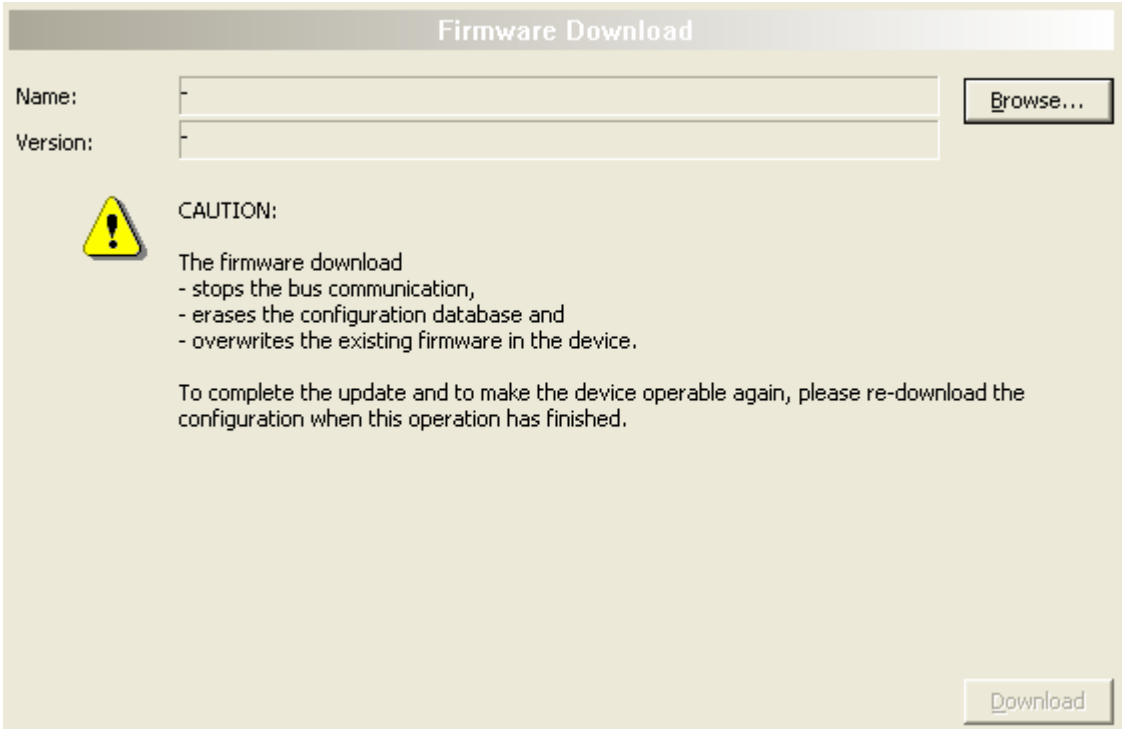

Firmware Download
Name:
Version:
Browse...
CAUTION:
The firmware download
- stops the bus communication,
- erases the configuration database and
- overwrites the existing firmware in the device.
To complete the update and to make the device operable again, please re-download the configuration when this operation has finished.
Download

Figure 11: Firmware Download

After opening the firmware file, the **Name** and the **Version** of the firmware are indicated in the upper section of the dialog.

By clicking the **Download** button, a safety query appears, if you really want to download the new firmware. Confirm this query with **Yes**, to download the new firmware.

2.4.1 Selecting Firmware File

In the **Select Firmware File** dialog window a firmware file can be selected. Therefore select the firmware to be loaded by clicking on it and confirm this selection by clicking on the **Open** button.

In the lower section of the dialog window **Select Firmware File** the following information is shown:

- **File name**
- **File type**
- **Recent folders** and
- **Firmware** (version number).

2.5 License Codes

To access the **License Codes** dialog, select **Settings > License Codes** from the Pages Tree-View. The dialog **License Codes** is displayed.

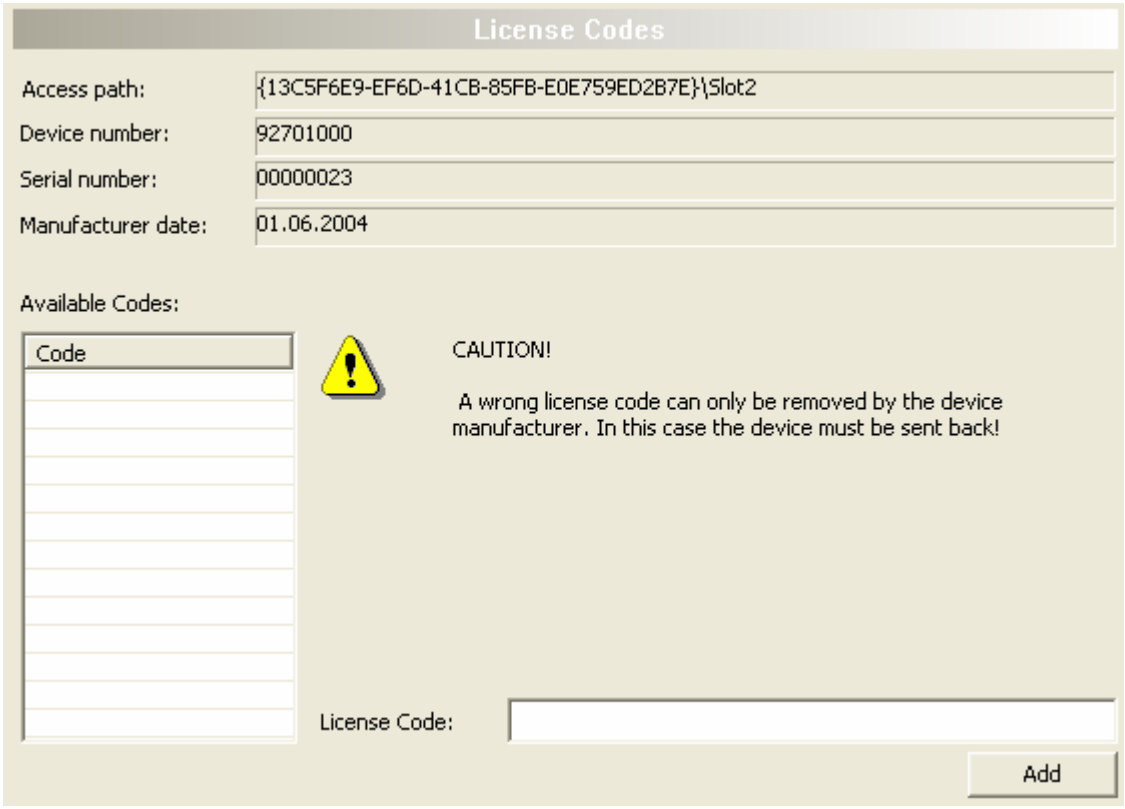


Figure 12: License Codes

After the device has been assigned (see section *Device Assignment* on page 19), the device data and the available license codes are displayed in the **License Codes** dialog.

If a license code must be registered to the device, enter the license code into the window **License Code** and click to the **Add** button.

The resulting character code for the device is saved at the device and is displayed in the **License Codes** dialog under **Available Codes**.

3 Configuration

3.1 Overview Configuration

Pages Tree-View **Configuration** for the PROFIBUS Master DTM:

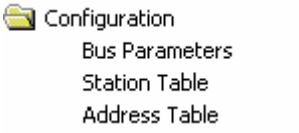


Figure 13: Pages Tree-View - Configuration

Descriptions to the configuration pages for the PROFIBUS Master DTM:

Bus Parameters	**Page**
Profile	*26*
Bus Parameters	*27*
Bus Monitoring	*30*
Error Handling	*31*
Calculated Timing	*32*

Table 15: Configuration Pages - Bus Parameters

Station Table	**Page**
Station Table	*33*

Table 16: Configuration Pages - Station Table

Address Table	**Page**
Address Table	*34*

Table 17: Configuration Pages - Address Table

3.2 Bus Parameters

The **Bus Parameters** are the basis of an operating data exchange. This section contains information for setting the Bus Parameters as well as the description of the individual parameters.

Basic Rule: The Bus Parameters must be set the same for all devices. The Station Address, on the other hand, must be different from device to device.

3.2.1 Profile

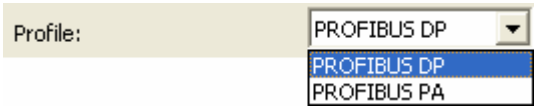


Figure 14: Bus Parameters > Profile

The following Profiles are available for the Hilscher Master DTM:

- PROFIBUS-DP (Decentralized Periphery)
- PROFIBUS-PA (Process Automation)

According to the selected profile the associated standard bus parameters are displayed when opening the dialog for the first time. Each parameter can be edited.

For the PROFIBUS-DP profile several baud rates can be selected. In the PROFIBUS-PA profile the baud rate 93.75 kBit/s is preset.

3.2.2 Bus Parameters

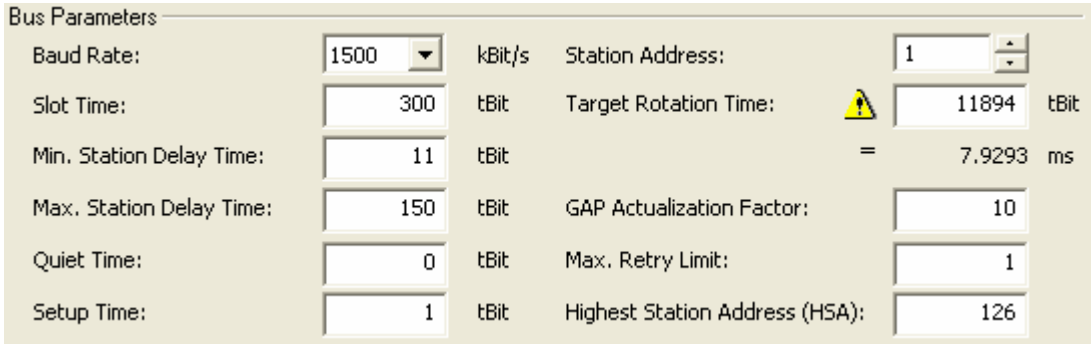


Figure 15: Bus Parameters > Bus Parameters

Caution: The changing of Bus Parameters can cause communication interruptions.

Note: The offline Bus Parameters are displayed. The Bus Parameters are transferred to the ABB device after the download of the configuration. A description about the download you find in section *Download* on page *63*.

Bus Parameters	**Meaning**		
Baud Rate	The **Baud Rate** is the data transfer speed: number of Bits per second. The **Baud Rate** must be set to be the same for all devices on the bus. The result of changing the Baud rate is that all other parameters must be re-calculated.		
	Baud Rate	**Bit time (t_{Bit})**	**Max cable length (type A)**
	9,6 kBit/s 19,2 kBit/s 31,25 kBit/s 45,45 kBit/s 93,75 kBit/s 187,5 kBit/s 500 kBit/s **1500 kBit/s** 3000 kBit/s 6000 kBit/s 12000 kBit/s	104,2 us 52,1 us 32 us 22 us 10,7 us 5,3 us 2 us 666,7 ns 333,3 ns 166,7 ns 83,3 ns	1200 m 1200 m 1200 m 1200 m 1200 m 1000 m 400 m 200 m 100 m 100 m 100 m
Slot time (T_{SL})	'Wait for receipt' – Monitoring time of the sender (Requestor) of telegram for the acknowledgement of the recipient (Responder). After expiration, a retry occurs in accordance with the value of 'Max. telegram retries'. Value range: 37 .. 16383 (The default value depends from the baud rate.)		
Min. Station Delay Time (min T_{SDR})	This is the shortest time period that must elapse before a remote recipient (Responder) may send an acknowledgement of a received query telegram. The shortest time period between reception of the last Bit of a telegram to the sending of the first Bit of a following telegram. Value range: 1 .. **11** .. 65535		
Max. Station Delay Time (max T_{SDR})	This is the longest time period that must elapse before a Sender (Requestor) may send a further query telegram. Greatest time period between reception of the last Bit of a telegram to the sending of the first Bit of a following telegram. The Sender (Requestor, Master) must wait at least for this time period after the sending of an unacknowledged telegram (e.g. Broadcast only) before a new telegram is sent. Value range: 1 .. 65535 (The default value depends from the baud rate.)		

More see next page.

Quiet Time (T_{QUI})	This is the time delay that occurs for modulators (Modulator-trip time) and Repeaters (Repeater-switch time) for the change over from sending to receiving. Value range: 0 .. 127 (The default value depends from the baud rate.)
Setup Time (T_{SET})	Minimum period "reaction time" between the receipt of an acknowledgement to the sending of a new query telegram (Reaction) by the Sender (Requestor). Value range: 0 .. 255 (The default value depends from the baud rate.)
Station Address	The Station Address is the individual device address of the Master device on the bus. Value range: 0 .. 125
Target Rotation Time (T_{TR})	Pre-set nominal Token cycling time within the Sender authorization (Token) will cycle around the ring. How much time the Master still has available for sending data telegrams to the Slaves is dependent on the difference between the nominal and the actual token cycling time. The **Target rotation time (T_{TR})** is shown in Bit times (tBit) like the other Bus Parameters. Below the displayed Bit time, the **Target rotation time** is also displayed in milliseconds (ms). Value range: 1 .. 2^{24}-1 (=16.777.215) (The default value depends on the number of Slaves attached to the Master and their module configuration)
GAP Actualization Factor (G)	Factor for determining after how many Token cycles an added participant is accepted into the Token ring. After expiry of the time period G*T_{TR}, the Station searches to see whether a further participant wishes to be accepted into the logical ring. Value range: 0 .. **10** .. 255
Max. Retry Limit	Maximum number of repeats in order to reach a Station. Value range: 1 .. 15 (The default value depends from the baud rate.)
Highest Station Address (HSA)	The **Highest Station Address** is the highest bus address up to which a Master searches for another Master at the bus in order to pass on the Token. This station address must on no account be smaller than the Master station address. Value range: 1 .. **126**

Table 18: Bus Parameters > Bus Parameters

3.2.2.1 Adjust Bus Parameters

If the bus configuration is changed and these changes have effects on the bus parameters, a note symbol appears next to the concerned parameters which displayed values are not longer actual.

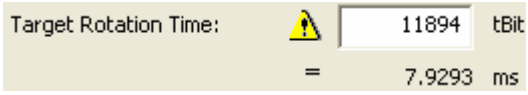


Figure 16: Note bus configuration was changed, Bus Parameters not longer actual

With the **Adjust** button the bus parameters on basis of the current bus configuration are calculated again and updated in the bus parameter dialog.

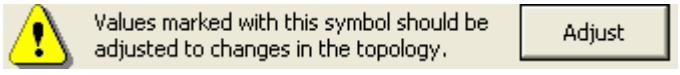


Figure 17: Button Adjust Bus Parameters

If no note symbol is displayed next to the parameters of the bus configuration, the indicated values are current and valid.

3.2.2.2 Additional Conditions for correct Communication

$T_{QUI} < \min T_{SDR}$

$T_{RDY} < \min T_{SDR}$

$T_{QUI} < T_{RDY}$

3.2.2.3 Representation of the Bus Parameters

All times for the Bus parameters are given in Bit times. The Bit time t_{Bit} is the result of the reciprocal of the Baud rate:

t_{Bit} = 1 / Baud rate (Baud rate in Bit/s)

The conversion from milliseconds into a Bit time is shown in the following formula:

Bit time = Time [milliseconds] * Baud rate

3.2.3 Bus Monitoring

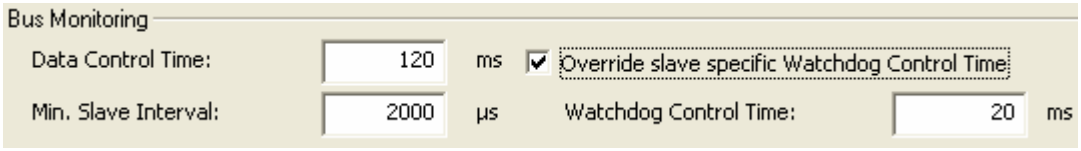


Figure 18: Bus Parameters > Bus Monitoring

Bus Parameters	Meaning
Data Control Time	The **Data Control Time** defines the time within the Data_Transfer_List is updated at least once. After the expiration of this period, the Master (class 1) reports its operating condition automatically via the Global_Control command. Value range: 1 .. 2^{32}-1 (= 4.294.967.295) (The default value depends from the baud rate.)
Min. Slave Interval	The **Min Slave Interval** defines the minimum time period between two Slave list cycles. The maximum value that the active Stations require is always given. Value range: 1 .. 65535 (The default value depends on the Slave types)
Override slave specific Watchdog Control Time	Each Slave returns a specific Watchdog Control Time to the Master. The option **Override slave specific Watchdog Control Time** allows the user to override individual slave specific settings with an equal value for all slaves configured at this master, for example to set a consistent value for slower transmission rates (which may require extended Watchdog Control Times) in critical environments.
Watchdog Control Time	The DP Slaves utilizes the **Watchdog Control Time** setting in order to detect communication errors to the assigned Master. When the Slave finds an interruption of an already operational communication, defined by a Watchdog time, then the Slave carries out an independent Reset and places the outputs into the secure condition. Value range: 0 .. 65025 (The default value depends on the number of Slaves attached to the Master and their configuration)

Table 19: Bus Parameters > Bus Monitoring

3.2.3.1 Adjust Bus Monitoring Parameter

If the bus configuration is changed and these changes have effects on the bus monitoring parameters, a note symbol appears next to the concerning parameters which displayed values are not longer current.

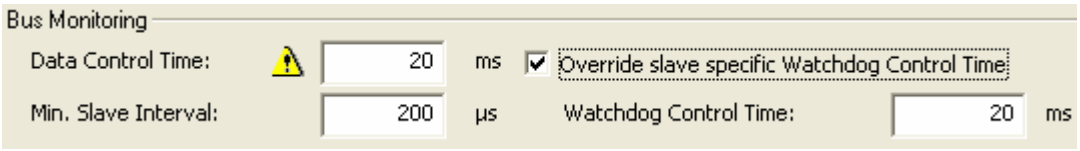


Figure 19: Note Bus configuration was changed, Bus Monitoring Parameters not longer actual

With the **Adjust** button the bus parameters on basis of the current bus configuration are calculated again and updated in the bus parameter dialog.

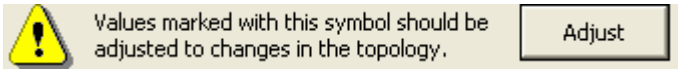


Figure 20: Button Adjust Bus Monitoring Parameters

If no note symbol is displayed next to the parameters of the bus monitoring configuration, the indicated values are current and valid.

3.2.4 Error Handling

Figure 21: Bus Parameters > Error Handling

For PROFIBUS-DP, the **Auto Clear** setting is provided for global error handling.

The DP Master monitors the data exchange to all DP Slaves by means of a timer.

- **Auto Clear ON (Enabled)**

  The **Masters Operation Mode** (see section *Master Operation Mode* on page *39*) will change from **Operate** to **Clear** and it shuts down the communication to all assigned Slaves, if at least one Slave is not responding within the **Data Control Time** (see section *Bus Monitoring* on page *30*).

- **Auto Clear OFF (Not Selected)**

  The **Master Operation Mode** (see section *Master Operation Mode* on page *39*) will stay in the mode **Operate** and the communication to all available Slaves is kept up.

3.2.5 Calculated Timing

Note: The **Calculated Timing** cannot be set; they result from the given calculations. The display of these times is only for information.

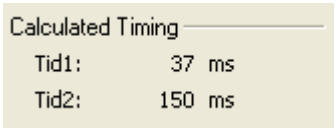


Figure 22: Bus Parameters > Calculated Timing

The **Calculated Timing** is the time that the Sender spends at idle after the receipt of the last Bit of a telegram on the Bus, until the first Bit of a new telegram is sent on the Bus.

Depending on the type of the telegram:

Bus Time	Meaning	Formula
Tid1	Tid1 starts after the Initiator has received an acknowledgement, answer or a Token telegram.	**Tid1** = max (T_{QUI} + 2 * T_{SET} + 2 + T_{SYN}, min T_{SDR}) T_{SYN} **(*)**
Tid2	Tid2 starts after the Initiator has sent a telegram that is not acknowledged.	**Tid2** = max (T_{QUI} + 2 * T_{SET} + 2 + T_{SYN}, max T_{SDR}) T_{SYN} **(*)**

Table 20: Bus Parameters > Calculated Timing

Depending on the utilized ASIC and the utilized Baud Rate, the **Tid1** and **Tid2** can assume somewhat different values because of the ASIC software.

(*) T_{SYN}:

This is the minimum time that must be available to each device as a rest condition before it is allowed to accept the start of a query and it is determined at 33 Bit times.

3.3 Station Table

The **Station Table** shows the list of all slave devices configured in the master configuration.

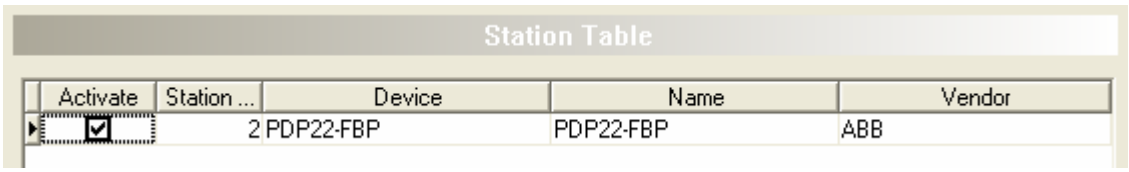


Figure 23: Station Table

Column	Meaning
Activate	Checkbox, to activate / deactivate a station
Station Address	Station address of the salve assigned
Device	Name of the salve assigned
Name	Name of the salve assigned
Vendor	Name of the vendor of the device

Table 21: Station Table

3.4 Address Table

The **Address Table** shows a list of all addresses used in the process data image. The displayed addresses refer to the used Master.

Auto Addressing

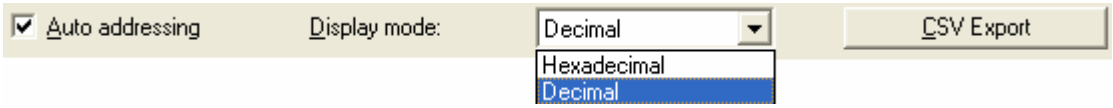


Figure 24: Address Table - Enable Auto Addressing

The **Auto Addressing** is enabled by default. The input and the output addresses of the modules are assigned automatically by the configuration software by means of information about the data type and the data length.

Deactivating the **Auto Addressing**, the user can assign the input respectively the output addresses of the modules manually. By a double click on an address of a module this field can be edit and a new address can be typed in. Confirming this modification by clicking on the **OK** button, the manual change of the address is taken over.

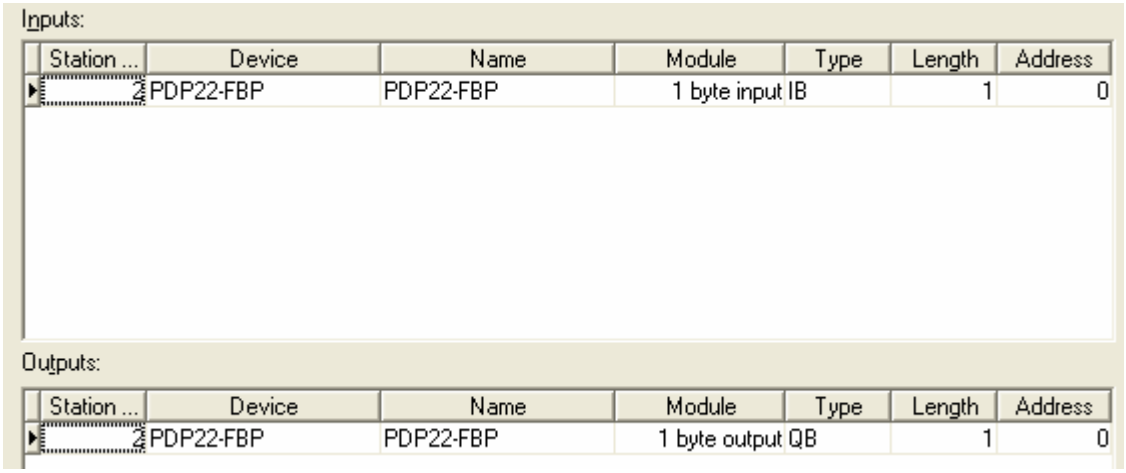

Inputs:
Station ... Device Name Module Type Length Address
2 PDP22-FBP PDP22-FBP 1 byte input IB 1 0
Outputs:
Station ... Device Name Module Type Length Address
2 PDP22-FBP PDP22-FBP 1 byte output QB 1 0

Figure 25: Address Table - Enable Auto Addressing deactivated

If the input and the output addresses of the configured modules were set manually by the user and the option **Auto Addressing** is activated, a message is displayed. This message refers, that the input and the output addresses, defined by the user, are overwritten and automatically generated newly, by means of the data type and the length when activating the **Auto Addressing**.

This message must be confirmed or aborted by the user.

Input / Outputs

The table **Input** or **Outputs** shows the list of all modules configured for this Master

Column	Meaning
Station Address	Station address of the assigned Slave device
Device	Name of the assigned Slave device
Name	Name of the assigned Slave device
Module	Name of the module according GSD
Type	Input data type or output data type
Length	Input data length or output data length
Address	Output data offset address or input data offset address

Table 22: Address Table - Input / Outputs

Under **Display Mode** the display mode of the station number, the length and the address can be predefined decimally or hex decimally.

The **CSV Export** button allows to export input- and output addresses as CSV file (CSV = comma separated value). The generated data can be opened with a spreadsheet application.

Sort Addresses

It is possible to sort the addresses of the modules by their **station address** of by the **data address**. Therefore the respective column head must be selected.

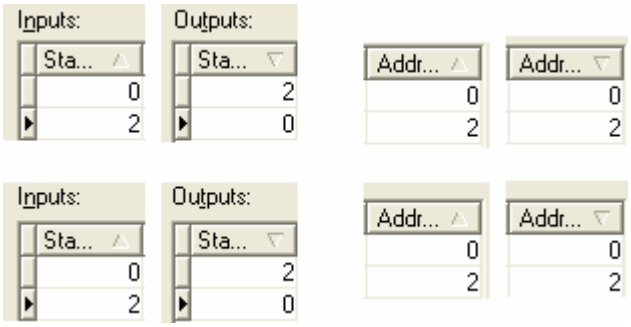


Figure 26: Address Table > Sort Addresses

4 Diagnosis

4.1 Overview Diagnosis

The **Diagnosis Functions** are mostly called up via the context menu of the device. Admittedly the menu direction depends on the frame application and it can vary.

The **Diagnosis** is shown in a dialog in which the cyclic states on the Bus Condition and the connected devices are shown.

Built Online Connection

To call up the diagnosis functions an online connection to the DTM has to be built up. Information about building up an online connection is described in section *Online to the Device* on page *63*.

Pages Tree-View **Diagnosis** for the PROFIBUS Master DTM:

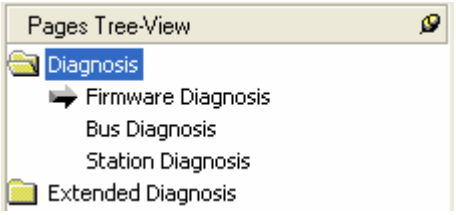


Figure 27: Pages Tree-View - Diagnosis

Descriptions to the diagnosis pages for the PROFIBUS Master DTM:

Firmware Diagnosis	**Page**
Firmware Diagnosis	*38*

Table 23: Diagnosis Pages - Firmware Diagnosis

Bus Diagnosis	**Page**
Master Operation Mode	*39*
Master Status	*40*
Bus Monitoring	*41*

Table 24: Diagnosis Pages - Bus Diagnosis

Station Diagnosis	**Page**
Station Status	*42*
Station Error	*42*

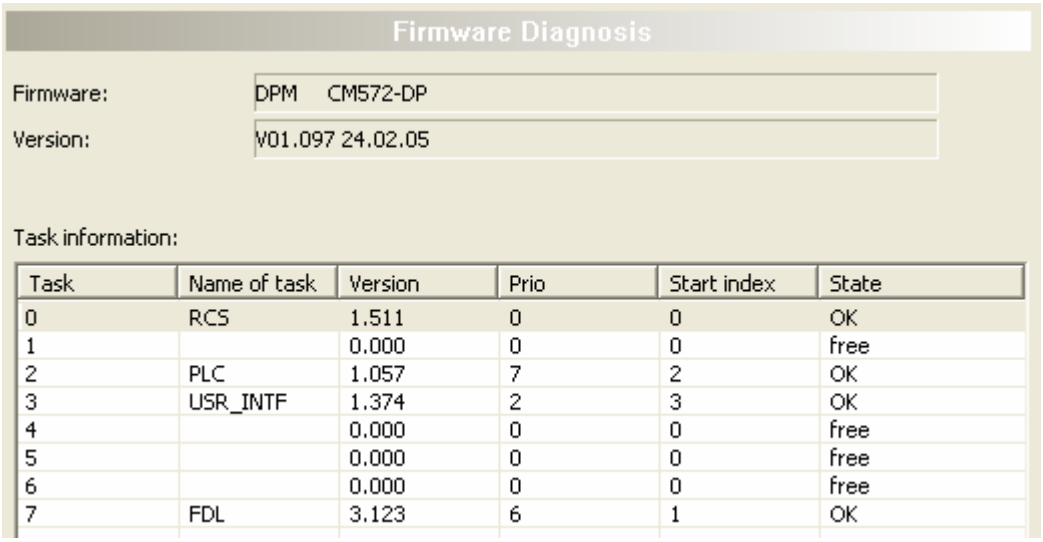
Table 25: Diagnosis Pages - Station Diagnosis

More details on extended diagnosis you can find in the section *Extended Diagnosis*, from page 43.

4.2 Firmware Diagnosis

In the dialog **Firmware Diagnosis** the actual task information of the firmware is displayed.

Under **Firmware** or **Version** the name of the firmware and version (including the date) are indicated.



Task	Name of task	Version	Prio	Start index	State
0	RCS	1.511	0	0	OK
1		0.000	0	0	free
2	PLC	1.057	7	2	OK
3	USR_INTF	1.374	2	3	OK
4		0.000	0	0	free
5		0.000	0	0	free
6		0.000	0	0	free
7	FDL	3.123	6	1	OK

Figure 28: Firmware Diagnosis

Task Information:

The table **Task Information** is listing the task information of the single firmware tasks.

Column	Meaning
Task	Task number
Task Name	Name of the task
Version	Version of the task
Prio	Priority of the task
Start Index	Start index of the task
Status	Status of the task

Table 26: Description Table Task Information

4.3 Bus Diagnosis

4.3.1 Master Operation Mode

Figure 29: Bus Diagnosis - Master Operation Mode

The **Master Operation Mode** shows the actual status of the Master:

Status	Meaning
Operate	The DP Master is in data exchange. In a data exchange the inputs of the DP Slaves are read and the output information is transferred to all DP Slaves.
Clear	The DP Master reads the input information of the DP Slaves and holds the outputs of the DP Slaves in a safe condition.
Stop	The Master is in the state Stop that means no data exchange takes place between the DP Master and the DP-Slaves. The Master was stopped by the application program or it had to go in the state Stop because of a bus error.
Offline	The DP Master does not exist on the bus, it is not on-line. This can happen if no or faulty bus parameters are set for the DP Master. Furthermore this can happen, if the correct bus parameters are set, but the application program has not activated the DP Master for data exchange on the bus.

Table 27: Bus Diagnosis - Master Operation Mode

4.3.2 Master Status

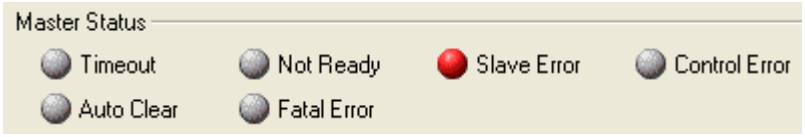


Figure 30: Bus Diagnosis - Master Status

The **Master Status** shows individual bus errors. A pending error is displayed by a red LED. The meaning of the individual errors is described in the following:

Master Status	Meaning
Timeout	The device has detected a skipped **TIMEOUT** supervision time because of rejected PROFIBUS telegrams. It's an indication for bus short circuits while the Master interrupts the communication. The number of detected timeouts is fixed in the field **Bus Monitoring** (see section *Bus Monitoring* on page *41*). The bit will be set when the first timeout was detected and can only be deleted via a reset of the device.
Not Ready	**HOST-NOT-READY** shows, that the application program has not started or it has stopped the DP Master.
Auto Clear	The **AUTO-CLEAR-ERROR** displays, that device has stopped the communication to all Slaves and it has reached the auto-clear end state.
Slave Error	The **NON-EXCHANGE-ERROR** shows, that at least one Slave is not in the cyclic data exchange with the DP Master.
Fatal Error	A **FATAL-ERROR** has occurred. Because of a heavy bus error no further bus communication is possible.
Control Error	The **CONTROL-ERROR** displays that a parameterization error has occurred.

Table 28: Bus Diagnosis - Master Status

4.3.3 Bus Monitoring

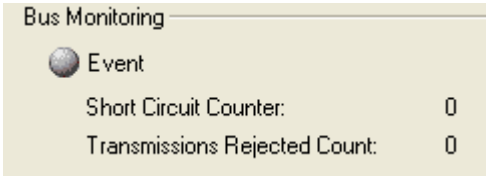


Figure 31: Bus Diagnosis - Bus Monitoring

Bus Monitoring	Meaning
Event	The **EVENT-ERROR** shows that the device has detected bus short circuits. The number of detected events is fixed in the next row **Short Circuit Counter**. The bit will be set when the first event was detected and will not be deleted any more. This result and the counters are only set back by a reset of the DP Master.
Short Circuit Counter	The **Short Circuit Counter** counts the short circuit on the PROFIBUS, which were detected by the Master. Range of Value: 0 .. 65535 (rollover possible)
Transmissions Rejected Count	The **Transmissions Rejected Count** displays the number of rejected telegrams. A possible reason for this is, that the Master itself can not receive the token anymore. Range of Value: 0 .. 65535 (rollover possible)

Table 29: Bus Diagnosis - Bus Monitoring

4.4 Station Diagnosis

4.4.1 Station Status

Figure 32: Station Diagnosis - Station Status

Under **Station status** all disposal station addresses (0-125) and their states are shown as LED.

If a connection to the device exists, the DTM updates this display cyclically.

4.4.2 Station Error

Below the **Station Error** a legend is represented, which describes possible states of the station addresses.

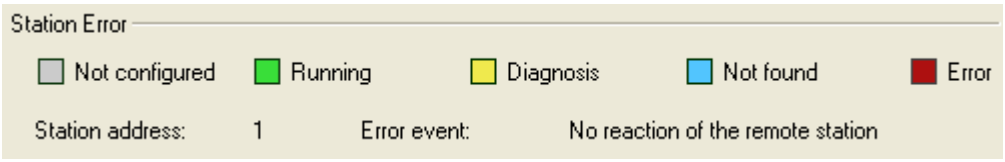


Figure 33: Station Diagnosis - Station Error s

Color of the Station Address	Meaning
grey	This Station Address is not configured
green	This Station Address is running
yellow	Diagnosis is available for this Station Address
blue	This Station Address was parameterized, but not found
red	This Station Address is faulty

Table 30: Station Diagnosis - Station Error s

Among the **Station Error** field information about the appeared error is shown. This display refers to the lowest station address, which signals diagnosis.

The **Station Address** indicates the address of the faulty station. Under **Error Event** the actual error is shown in plain text.

5 Extended Diagnosis

5.1 Overview Extended Diagnosis

The Extended Diagnosis helps to find bus and configuration errors when the standard diagnosis functions are of no further help. The extended diagnosis contains a list of diagnosis structures. These contain online counters, states and parameters.

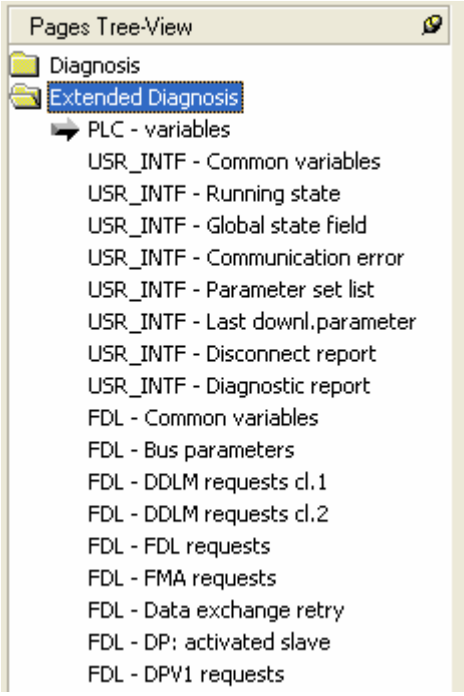


Figure 34: Pages Tree-View - Extended Diagnosis

The following pages for extended diagnosis are available:

Extended Diagnosis	Page
PLC - Variables	*45*
USR_INTF - Common Variables	*46*
USR_INTF - Running State	*47*
USR_INTF - Global State Field	*48*
USR_INTF - Communication Error	*49*
USR_INTF - Parameter Set List	*50*
USR_INTF - Last Downl.parameter	*50*
USR_INTF - Disconnect Report	*51*
USR_INTF - Diagnostic Report	*52*
FDL - Common Variables	*53*
FDL - Bus Parameters	*54*
FDL - DDLM Request cl.1	*55*
FDL - DDLM Request cl.2	*56*
FDL - FDL request	*57*
FDL - FMA request	*58*
FDL - Data exchange retry	*59*
FDL - DP: activated slave	*60*
FDL - DPV1 requests	*61*

Table 31: Pages Extended Diagnosis - Overview

5.2 PLC - Variables

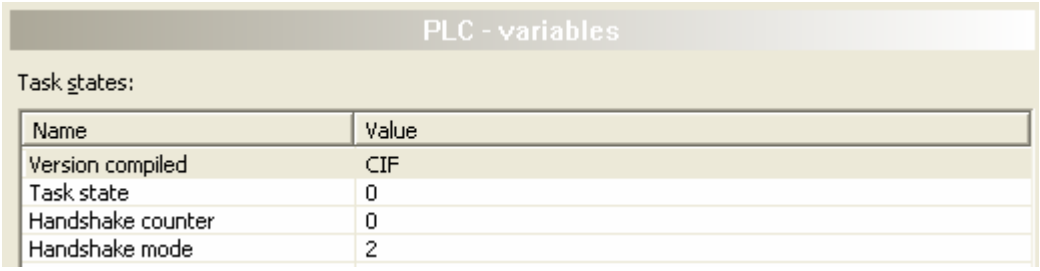


Figure 35: Extended Diagnosis - PLC - Variables

Name	Value
Version compiled	Hardware
Task state	Task State
Handshake counter	Counter for the performed process data handshakes on the part of application
Handshake mode	This value represents the actual handshake mode between application and device. 0 = Bus synchronous, Device Controlled 1 = Buffered, Device Controlled 2 = No consistence, Uncontrolled 3 = Buffered, Host Controlled 4 = Bus synchronous, Host Controlled

Table 32: Extended Diagnosis - PLC - Variables

5.3 USR_INTF - Common Variables

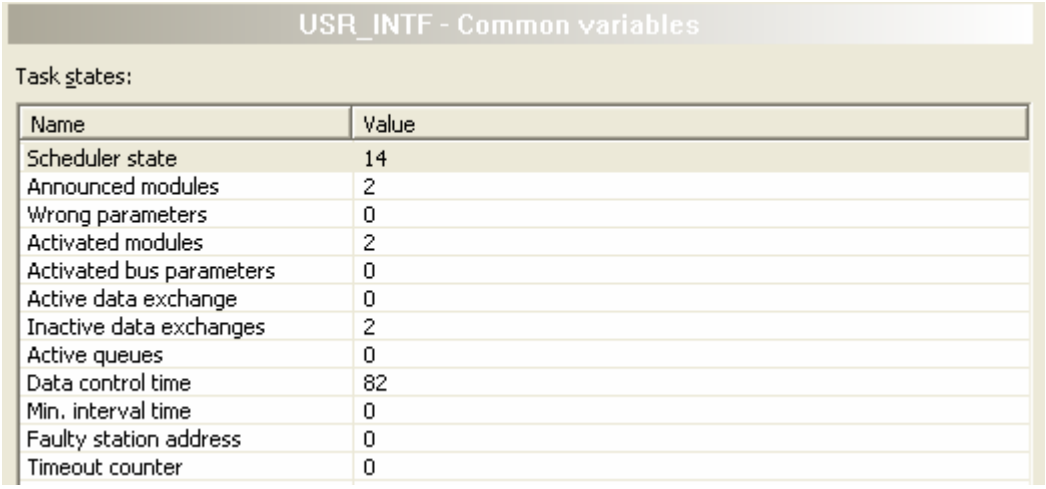


Figure 36: Extended Diagnosis - USR_INTF - Common variables

Name	**Value**
Scheduler State	Status value of the Scheduler
Announced Modules	Number of configured Slaves
Wrong Parameters	Number of Slaves with faulty data sets
Activated Modules	Number of activated Slaves
Activated Bus Parameters	0 = Bus Parameter active, 255 = Bus Parameter inactive
Active Data Exchange	Current active Data_Exchange-Service
Inactive Data Exchange	Number of Stations with that no process data possible is
Active Queues	Number of stored Commands
Data Control Time	Counter of Data_Contol_Time
Min. Interval Time	Counter of min.Slave_Intervals
Faulty Station Address	Station address of the faulty Station
Timeout Counter	Supervision counter that is activated when a short circuit was detected on the bus

Table 33: Extended Diagnosis - USR_INTF - Common variables

5.4 USR_INTF - Running State

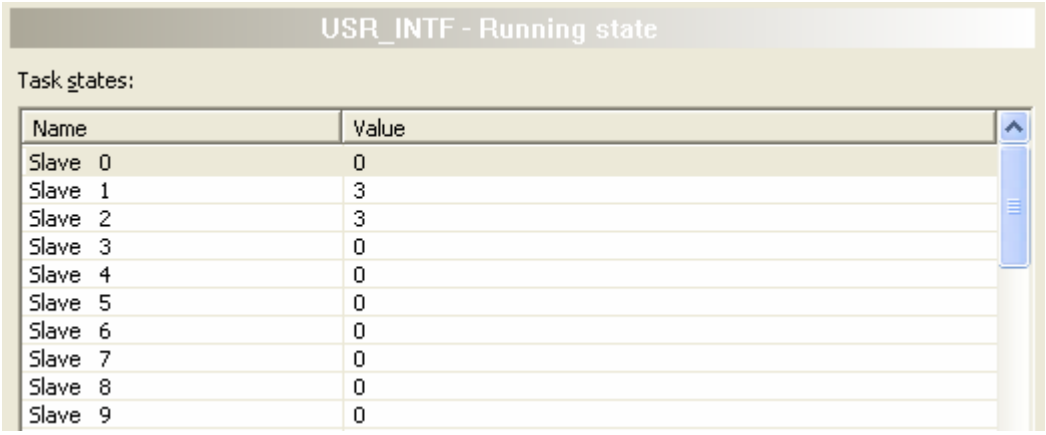


Figure 37: Extended Diagnosis - USR_INTF - Running State

To manage the different device states from the view of the Master, the Master device has a memory.

Name	Value
Slave x (x=0 .. 125)	Slave handler-State for Station address x

Table 34: Extended Diagnosis - USR_INTF - Running State

5.5 USR_INTF - Global State Field

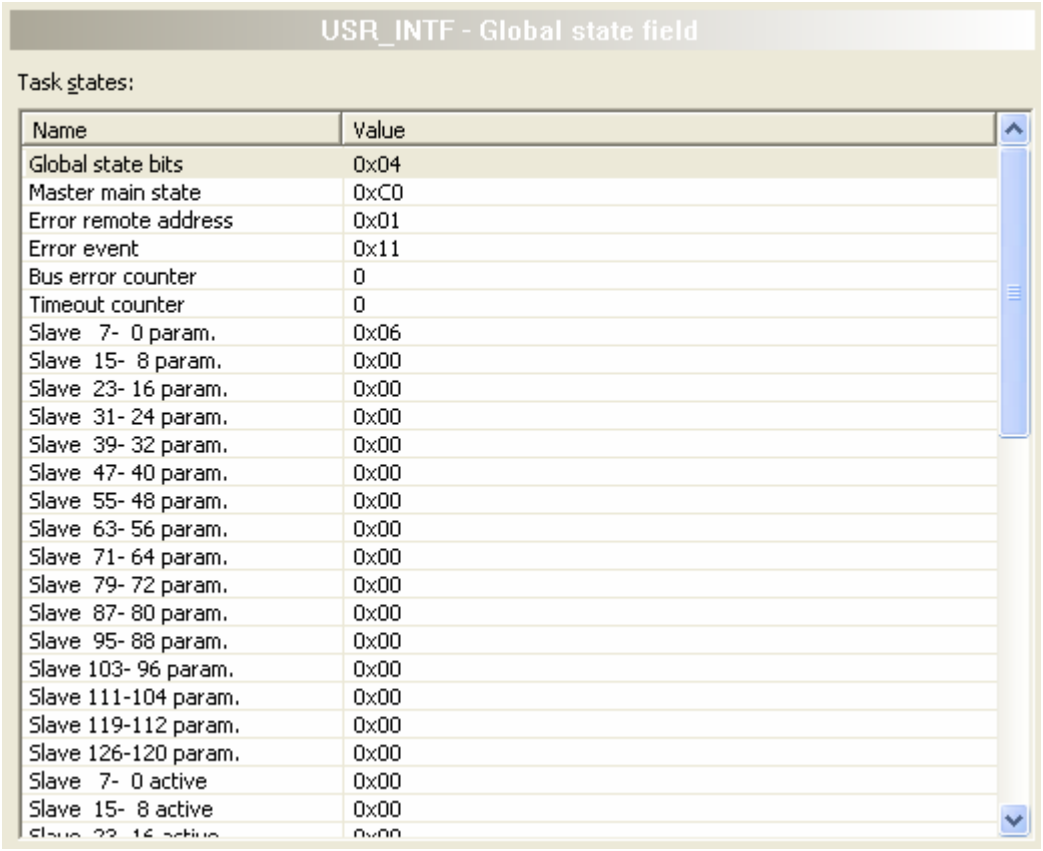

USR_INTF - Global state field
Task states:
Name
Value
Global state bits 0x04
Master main state 0xC0
Error remote address 0x01
Error event 0x11
Bus error counter 0
Timeout counter 0
Slave 7- 0 param. 0x06
Slave 15- 8 param. 0x00
Slave 23- 16 param. 0x00
Slave 31- 24 param. 0x00
Slave 39- 32 param. 0x00
Slave 47- 40 param. 0x00
Slave 55- 48 param. 0x00
Slave 63- 56 param. 0x00
Slave 71- 64 param. 0x00
Slave 79- 72 param. 0x00
Slave 87- 80 param. 0x00
Slave 95- 88 param. 0x00
Slave 103- 96 param. 0x00
Slave 111-104 param. 0x00
Slave 119-112 param. 0x00
Slave 126-120 param. 0x00
Slave 7- 0 active 0x00
Slave 15- 8 active 0x00

Figure 38: Extended Diagnosis - USR_INTF - Global state field

Name	Value
Global state bits	The ‘Global state bits’ are described in detail in section *Master Status* on page 40.
Master main state	A description about the task ‘Master main state’ you find in section *Master Operation Mode* on page 39.
Error remote address	Displays the lowest station address, which signals diagnosis. Further information about this you find in section *Station* on page 42.
Error event	Indicates the occurred error of the ‘Error remote address’. Further information about this you find in section *Station* on page 42.
Bus error counter	The ‘Bus error counter’ is increased, whenever an increased number of faulty PROFIBUS frames were detected. For further information see section *Bus Monitoring* on page 41.
Timeout counter	This counter counts the number of reported bus-off-events. For further information see section *Bus Monitoring*, on page 41.

More see next page.

Slave 7- 0 param.	8 Bit parameter state Slave 0-7
Slave 15- 8 param.	8 Bit parameter state Slave 8-15
…	…
Slave 63- 56 param.	8 Bit parameter state Slave 56-63
Slave 7- 0 active	8 Bit active state Slave 0-7
Slave 15- 8 active	8 Bit active state Slave 8-15
…	…
Slave 63- 56 active	8 Bit active state Slave 56-63
Slave 7- 0 diagnostic	8 Bit diagnostic state Slave 0-7
Slave 15- 8 diagnostic	8 Bit diagnostic state Slave 8-15
…	…
Slave 63- 56 diagnostic	8 Bit diagnostic state Slave 56-63

Table 35: Extended Diagnosis - USR_INTF - Global state field

5.6 USR_INTF - Communication Error

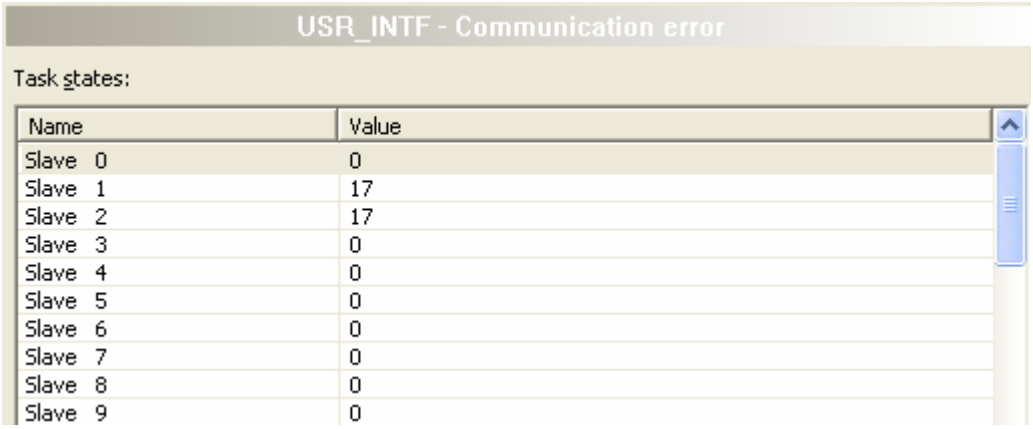


Figure 39: Extended Diagnosis - USR_INTF - Communication Error

For each Slave device the Master has an internal error status, which is displayed in this dialog window above.

Name	**Value**
Slave x (x=0 .. 125)	Error number of the Slave

Table 36: Extended Diagnosis - USR_INTF - Communication Error

5.7 USR_INTF - Parameter Set List

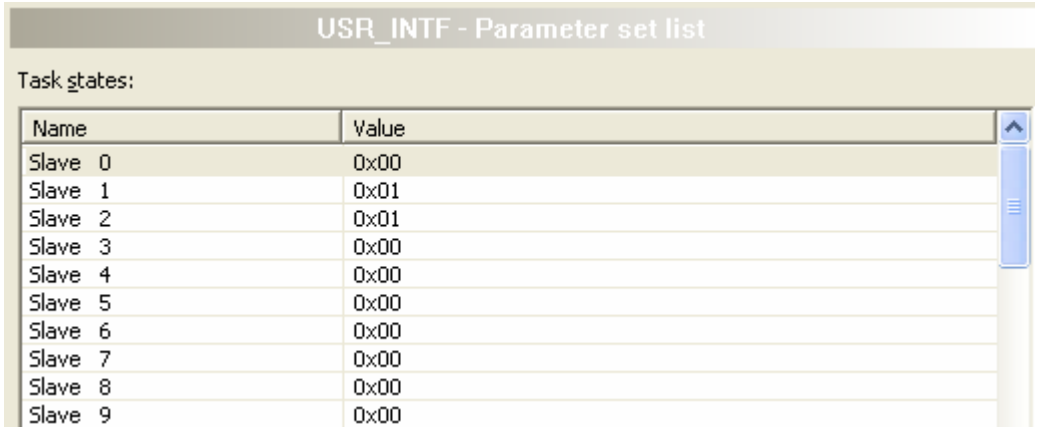


Figure 40: Extended Diagnosis - USR_INTF - Parameter Set List

Name	Value
Slave x (x=0 .. 125)	0 = no or no valid parameter data set 1 = valid parameter data set

Table 37: Extended Diagnosis - USR_INTF - Parameter Set List

5.8 USR_INTF - Last Downl.parameter

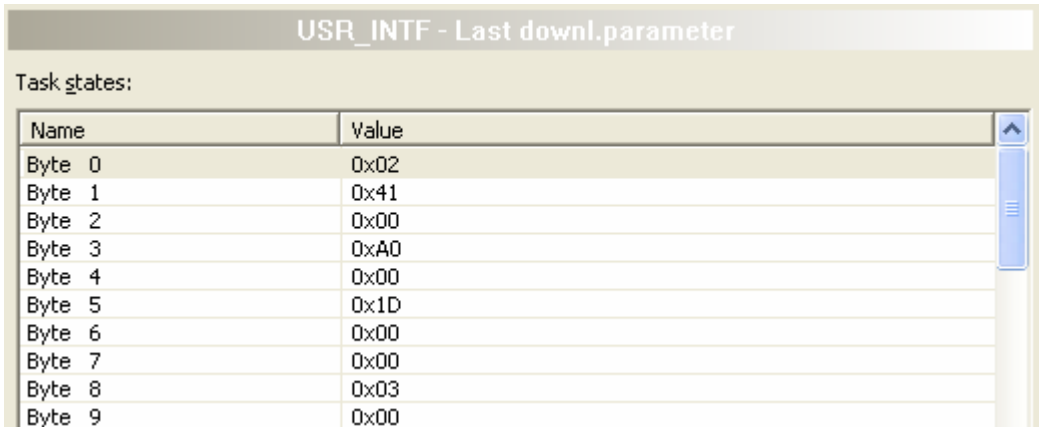


Figure 41: Extended Diagnosis - USR_INTF - Last Downl.parameter

Name	Value
Byte 0 to 119	Last parameter data set

Table 38: Extended Diagnosis - USR_INTF - Last Downl.parameter

5.9 USR_INTF - Disconnect Report

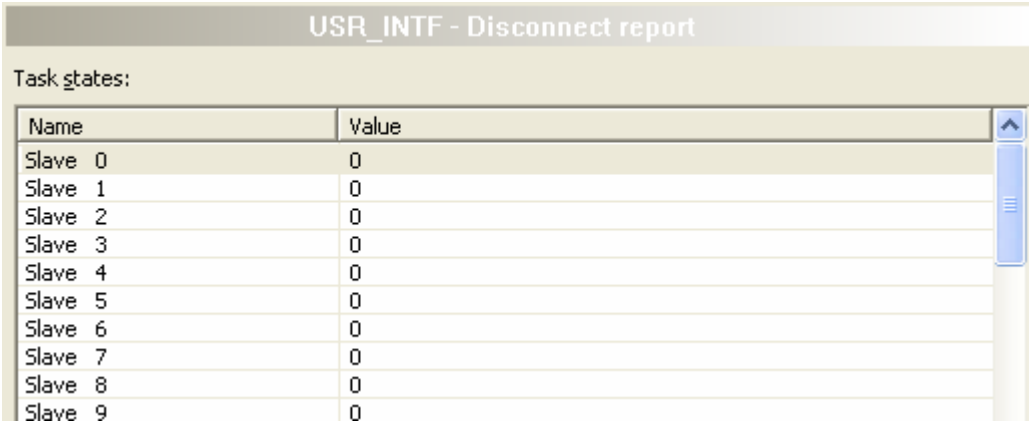


Figure 42: Extended Diagnosis - USR_INTF - Disconnect Report

Name	Value
Slave (x=0 .. 125)	Counter for disconnection for Slave x (x = 0 to 125)

Table 39: Extended Diagnosis - USR_INTF - Disconnect Report

The status table shows the number of communication break downs (disconnections) resulted by a bus communication errors for each Slave station. The counter is incremented only when the Master was communicating in the 'Data Exchange All' mode with all Slaves before. A hard error is when the max retries were reached (given by the Max_Retry_Limit). See bus parameter Max_Retry_Limit.

5.10 USR_INTF - Diagnostic Report

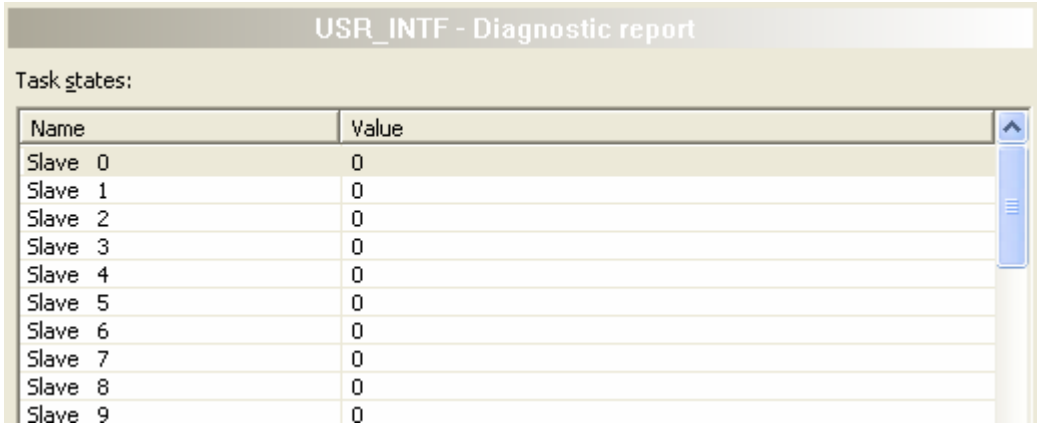


Figure 43: Extended Diagnosis - USR_INTF - Diagnostic Report

Name	Value
Slave (x=0 .. 125)	Counter for diagnostic reports for Slave x (x = 0 .. 125)

Table 40: Extended Diagnosis - USR_INTF - Diagnostic Report

The status table shows the number of diagnostic reports for each Slave station which the diagnosis has reported to the Master. For each received report the data_exchange state to this Slave was left for one DP cycle to read out the diagnostic information.

5.11 FDL - Common Variables

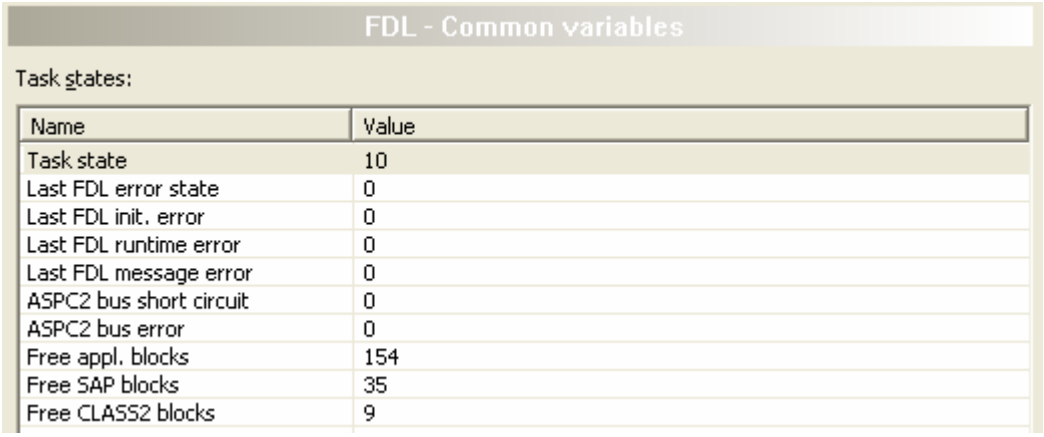


Figure 44: Extended Diagnosis - FDL - Common Variables

Name	Value
Task state	Task state number
Last FDL error state	Error state
Last FDL int. error	Initialization error
Last FDL runtime error	Runtime error
Last FDL message error	Counter for occurred bus synchrony error reports or bus short circuits of the ASPC2
ASCP2 bus short circuit	Counter for occurred bus error reports of the ASPC2
ASPC2 bus error	free applications blocks of the software
Free appl. blocks	free SAP blocks of the software
Free SAP blocks	free class 2 blocks of the software
Free CLASS2 blocks	

Table 41: Extended Diagnosis - FDL - Common Variables

5.12 FDL - Bus Parameters

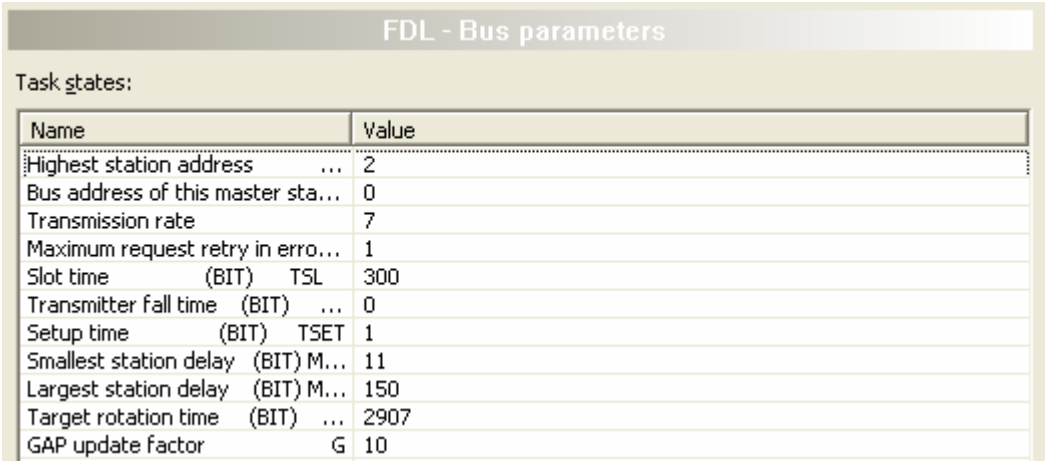


Figure 45: Extended Diagnosis - FDL - Bus Parameters

Name	**Value**
Highest station address HSA	HSA Highest Station address
Bus address of this master station TS	TS (This station) own bus address
Transmission rate	Transmission rate 0 = 9600; 1 = 19200; 2 = 93,75; 3 = 187,5; 4 = 500k; 6 = 1.5M; 7 = 3M; 8 = 6M; 9 = 12M; 10= 31,25M; 11= 45,45M
Maximum request retry in error case	Number of retries for bus errors
Slot time (BIT) TSL	TSL Slot Time
Transmitter fall time (BIT) TQUI	TQUI Transmitter Fall Time
Setup time (BIT) TSET	TSET Setup Time
Smallest station delay (BIT) MIN- TSDR	MIN TSDR minimum station delay
Largest station delay (BIT) MAX- TSDR	MAX TSDR maximum station delay
Target rotation time (BIT) TTR	TTR Target Rotation Time
GAP update factor G	G GAP Update Factor

Table 42: Extended Diagnosis - FDL - Bus Parameters

5.13 FDL - DDLM Request cl.1

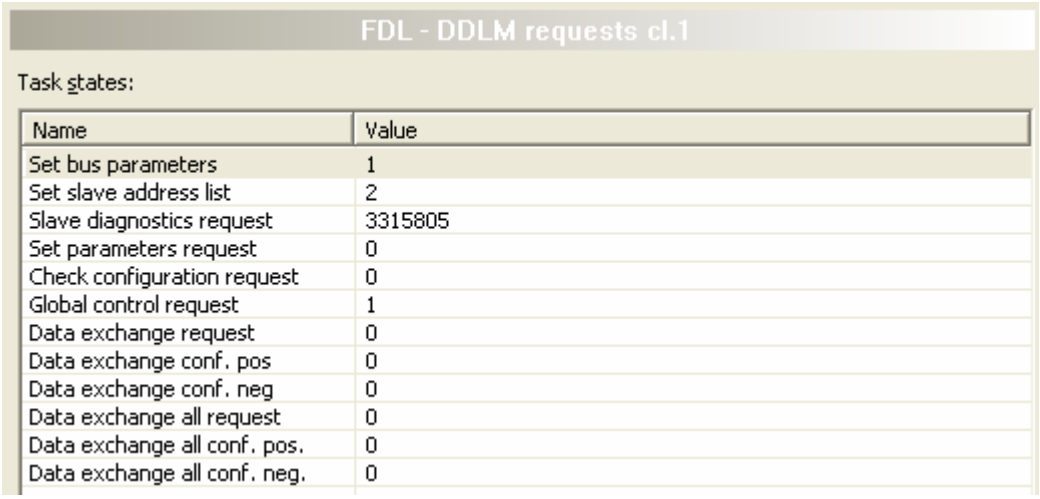

FDL - DDLM requests cl.1
Task states:
Name
Value
Set bus parameters 1
Set slave address list 2
Slave diagnostics request 3315805
Set parameters request 0
Check configuration request 0
Global control request 1
Data exchange request 0
Data exchange conf. pos 0
Data exchange conf. neg 0
Data exchange all request 0
Data exchange all conf. pos. 0
Data exchange all conf. neg. 0

Figure 46: Extended Diagnosis - FDL - DDLM Request cl.1

Name	Value
Set bus parameters	Counter for 'Set-Bus-Par' Request
Set slave address list	Counter for 'Set-Slave-List' Request
Slave diagnostic request	Counter for 'Slave-Diag' Request
Set parameters request	Counter for 'Set-Prm' Request
Check configuration request	Counter for 'Check-Cfg' Request
Global control request	Counter for 'Global-Control' Request
Data exchange request	Counter for 'Data-Exchange' Request
Data exchange conf. pos.	Counter for 'Data-Exchange' Confirmation positive
Data exchange conf. neg.	Counter for 'Data-Exchange' Confirmation negative
Data exchange all request	Counter for 'Data-Exchange-All' Request
Data exchange all conf. pos.	Counter for positive Confirmation of 'Data-Exchange-All'
Data exchange all conf. neg.	Counter for negative Confirmation of 'Data-Exchange-All'

Table 43: Extended Diagnosis - FDL - DDLM Request cl.1

Services, which were send continued to the according to the PROFIBUS-DP standard are counted in this table. Fundamental only the 'data-exchange-all' should be count in a faultless network. The services 'set-slave-list', 'set-prm', 'chk-cfg', 'data-exchange' permits in case of faultless course for each configured Slave module to be activated only one time. If the count changes continuously in case of these services, a bus error has occurred. If for example the service 'slave-diag' changes sporadically the bus cable can have a defect or the terminating resistor is missing in the cable. It is also possible that a conscious error report of a Slave module that activates the service in the Master.

5.14 FDL - DDLM Request cl.2

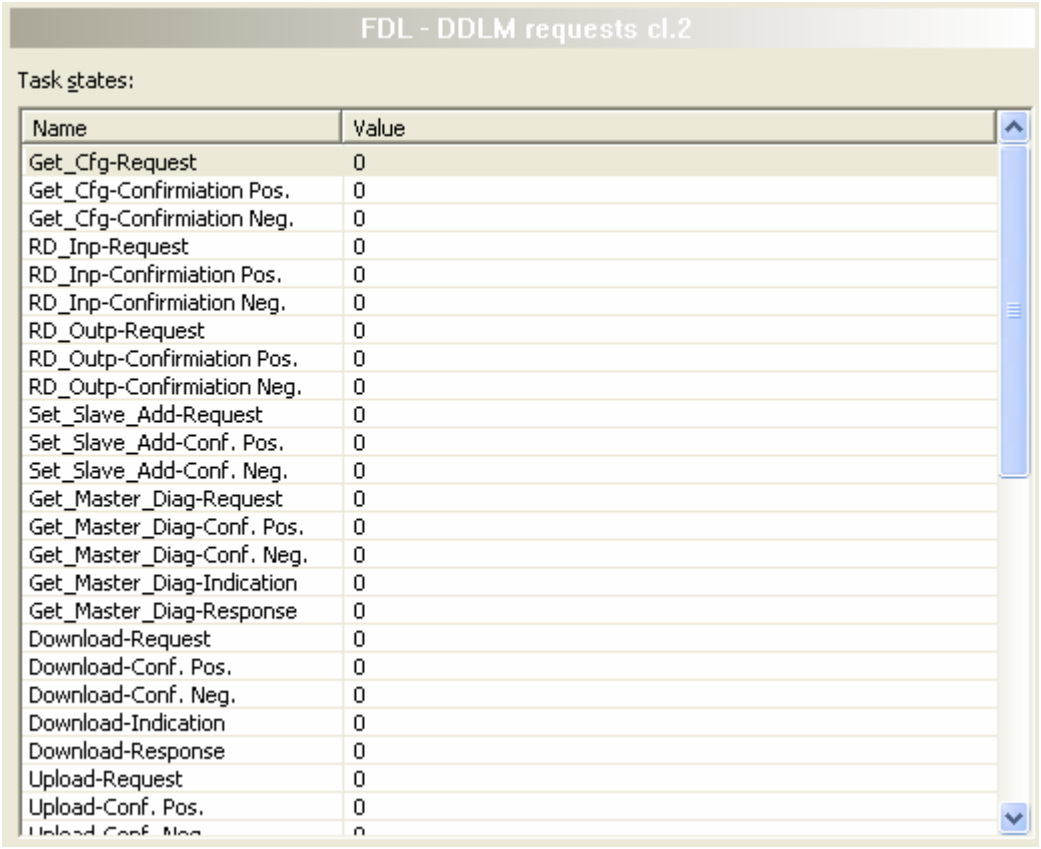


Figure 47: Extended Diagnosis - FDL - DDLM Request cl.2

Name	Value
Service/Function	Counter for this Service/Function

Table 44: Extended Diagnosis - FDL - DDLM Request cl.2

5.15 FDL - FDL request

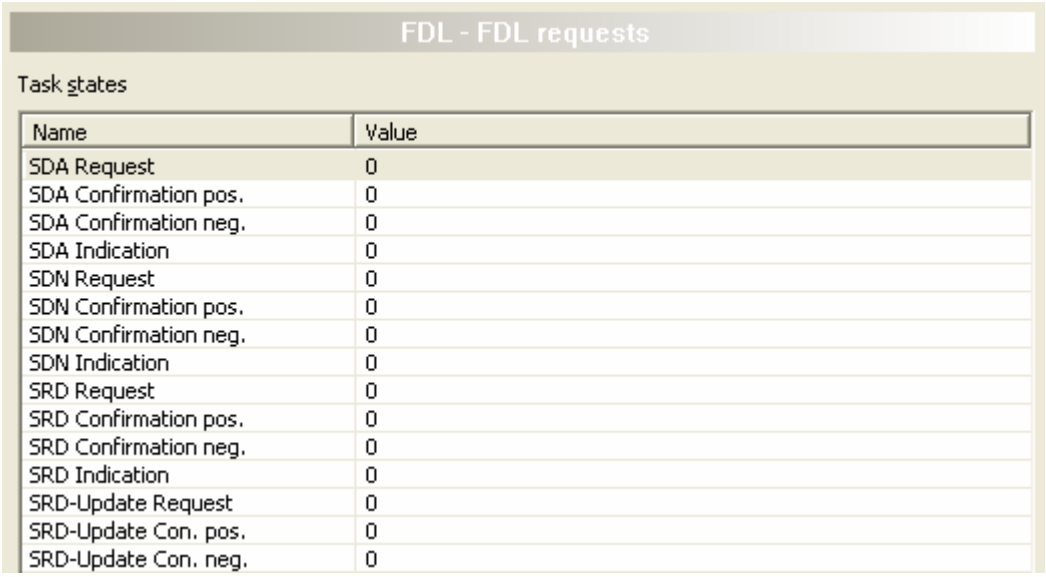


Figure 48: Extended Diagnosis - FDL - FDL request

Name	Value
Service/Function	Counter for this Service/Function

Table 45: Extended Diagnosis - FDL - FDL request

5.16 FDL - FMA request

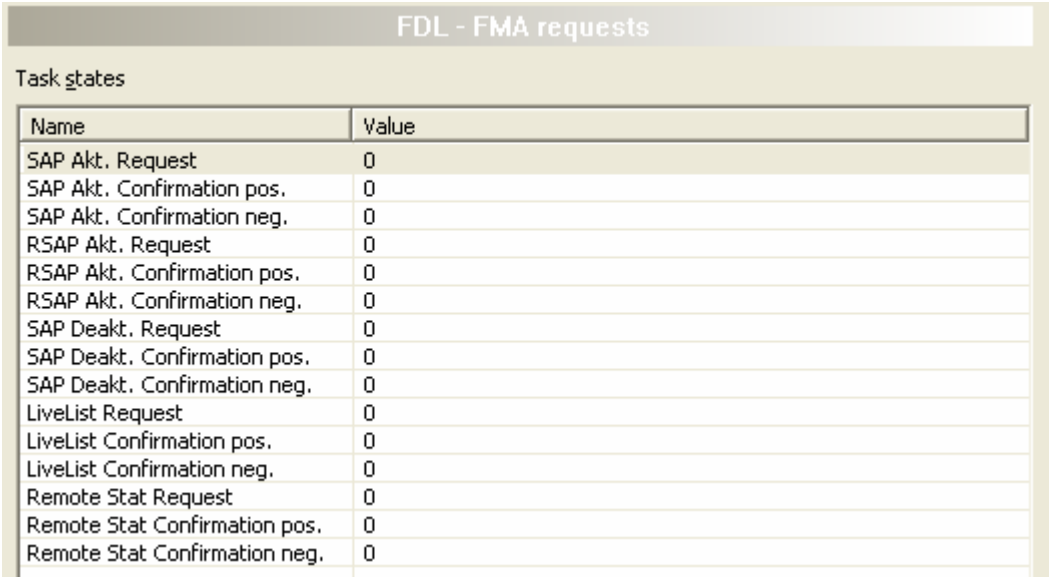


Figure 49: Extended Diagnosis - FDL - FMA request

Name	Value
Service/Function	Counter for this Service/Function

Table 46: Extended Diagnosis - FDL - FMA request

5.17 FDL - Data exchange retry

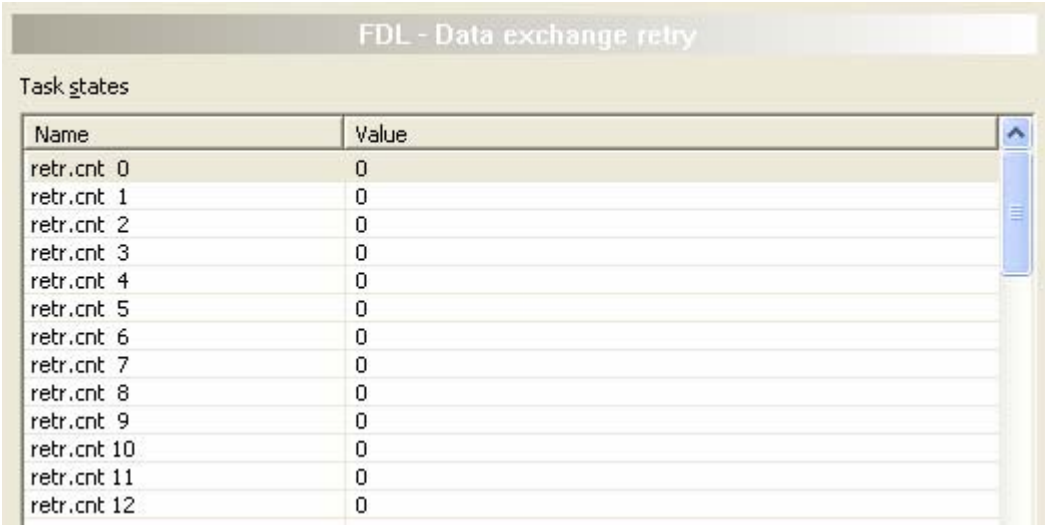


Figure 50: Extended Diagnosis - Data exchange retry

Name	Value
Service/Function	Counter for this Service/Function

Table 47: Extended Diagnosis - FDL - Data exchange retry

5.18 FDL - DP: activated slave

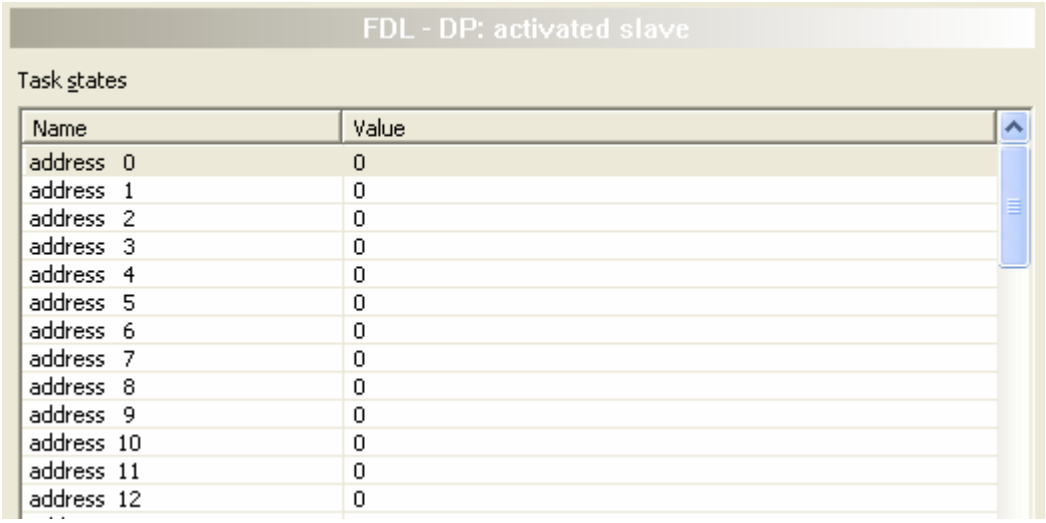


Figure 51: Extended Diagnosis - FDL - DP: activated slave

Name	Value
Service/Function	Counter for this Service/Function

Table 48: Extended Diagnosis - FDL - DP: activated slave

5.19 FDL - DPV1 requests

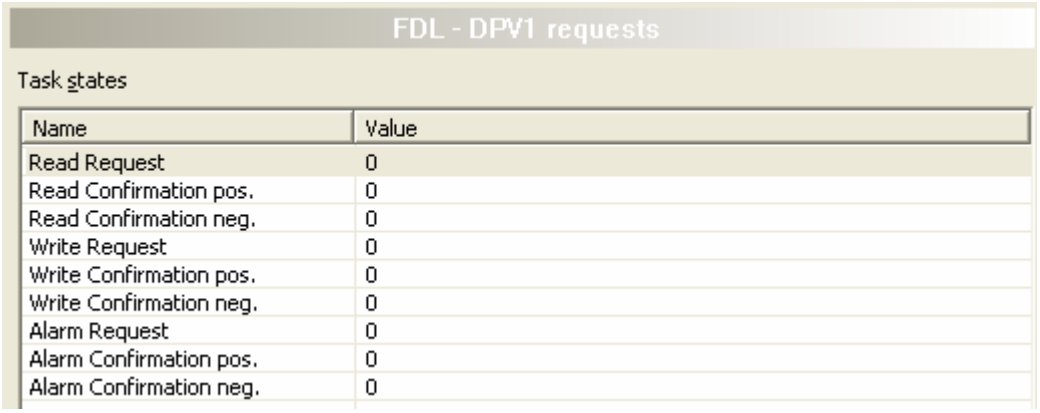


Figure 52: Extended Diagnosis - FDL - DPV1 requests

Name	Value
Service/Function	Counter for this Service/Function

Table 49: Extended Diagnosis - FDL - DPV1 requests

6 Online to the Device

6.1 Connect/Disconnect

Note: For several functions e.g. diagnostic, it is necessary, that an online connection to the Master DTM exists.

- **Build up Connection**

  A connection to the device is built up via the context menu of the device.

Now the ABB Master device is online.

The connection is also necessary for several functions apart from the Diagnostic, for example for downloading the configuration. More information about the Download you find in section *Download* on page *63*.

- **Disconnect**

  If the connection to the device should be disconnected, the context menu of this device has to be called up again.

Note: For further information about building up or disconnecting a connection see the description of the frame application.

6.2 Download

A download to the Master has to be made to transfer the configuration with the corresponding parameter data.

Note: Before a download can be made, a connection to the device has to be building up. Further information about building up a connection you find in section *Connect/Disconnect* on page *63*.

If the download was successfully, the actual configuration in the application is loaded down into the Master device.

7 Error Numbers

7.1 Possible PLC Error Messages

Error Number	Description
401	driver error in the control
402	slot number is not supported by the hardware
403	no coupler at the given slot
404	control not in STOP
405	configuration data invalid
406	coupler still configured
407	answer timeout of the coupler

Table 50: Possible Control Error Messages

7.2 RCS Error Numbers

This is the list of error numbers returned by the RCS (Realtime Communication System), that is the operating system of ABB devices. The error number is returned in an answer message. Command messages and answer messages are used to communicate between the application and the ABB device. An example of this communication is the download of a configuration.

Error Number	Description
4	Task does not exist
5	Task is not initialized
6	The MCL is locked
7	The MCL rejects a send command because of an error
20	The user will download a database into the device that is not valid for this device type.
21	Data base segment not configured or not existed
22	Number for message wrong during download
23	Received number of data during download does not match to that in the command message
24	Sequence identifier wrong during download
25	Checksum after download and checksum in command message do not match
26	Write/Read access of data base segment
27	Download/Upload or erase of configured data base type is not allowed
28	The state of the data base segment indicated an error. Upload not possible
29	The access to the data base segment needs the bootstraploader. The bootstraploader is not present
30	Trace buffer overflow
31	Entry into trace buffer too long
37	No or wrong license. The OEM license of the System Configurator allows only communication to devices that have the same license inside
38	The data base created by the System Configurator and the data base expected by the firmware is not compatible
39	DBM module missing

Table 51: RCS error numbers (answer message) (4 .. 39)

Error Number	Description
40	No command free
41	Command unknown
42	Command mode unknown
43	Wrong parameter in the command
44	Message length does not match to the parameters of the command
45	Only a MCL does use this command to the RCS
50	FLASH occupied at the moment
51	Error deleting the FLASH
52	Error writing the FLASH
53	FLASH not configured
54	FLASH timeout error
55	Access protection error while deleting the FLASH
56	FLASH size does not match or not enough FLASH memory
60	Wrong structure type
61	Wrong length of structure
62	Structure does not exist
70	No clock on the device
80	Wrong handle for the table (table does not exist)
81	Data length does not match the structure of this table
82	The data set of this number does not exist
83	This table name does not exist
84	Table full. No more entries allowed
85	Other error from DBM
90	The device info (serial number, device number and date) does already exist
91	License code invalid
92	License code does already exist
93	All memory locations for license codes already in use

Table 52: RCS error numbers (answer message) (40 .. 93)

7.3 Database Access Error Numbers

The following table lists the error numbers of the database access errors

Error Number	Description
100	Database already opened
101	Dataset could not be opened
103	Error while opening database occurred
104	No valid path name
105	No connection to data base. Call function DbOpen().
106	Error in parameter
107	Error during opening a table
108	Nullpointer occurred
109	Table not opened. Call function OpenTable() first.
110	The first record is reached
111	The last record is reached
112	Unknown type in the record found
113	Data has to be truncated
114	No access driver installed on the system
115	Exception received
116	This table is set to read only
117	There is no data set in the table
118	The requested table could not be edit
119	An operation could not be completed
120	User gives an unexpected length in WriteDs().
121	An assertion failed
122	DLL not found
123	DLL couldn't be freed
124	Specified function not found in the DLL
125	ODBC Function returns an error
126	Count of data bytes in the record exceeds 1938
127	DBM32 DLL is not loaded
128	Field with the given index was not found
129	This table contains no records
130	Invalid character (' ') found in a Table or Column

Table 53: Database Access Error Numbers (100 .. 130)

7.4 Online Data Manager Error Numbers

7.4.1 Online Data Manager Error Numbers

The following table lists the error numbers of the Online Data Manager.

Error Number	Description
1000	Driver OnlineDataManager not opened
1001	Initialization of the OnlineDataManager has failed
1002	No DriverObject found. OnlineDataManager Sub DLL not found.
1003	No DeviceObject found. Device not found.
1004	Application not found
1010	Application has requested an unknown event
1011	Application has requested an unknown function mode, operating mode. Known function modes, operating modes are Reset, Download, Register Server, Unregister Server.
1012	Application has requested an unknown command
1013	Message Server already exists
1014	Message Server not registered
1015	Device already in use
1016	Device not assigned
1017	Device has changed
1018	Command active

Table 54: Online Data Manager Error numbers (1000 .. 1018)

7.4.2 Message Handler Error Numbers

The following table lists the error numbers of the Message handler of the Online Data Manager.

Error Number	Description
2010	Message handler: Messagebuffer empty
2011	Message handler: Messagebuffer full
2021	Message handler: Invalid Message ID (msg.nr)
2022	Message handler: No entry
2023	Message handler: Message already active
2024	Message handler: Wrong Application
2025	Message handler: Message Timeout No message received. **Possible Error Cause:** Different reasons. **(1)** The selected interrupt is not free or used also from another PC component (shared interrupt). **(2)** CIF is not initialized. This is shown by an acyclic flashing RUN LED. **(3)** CIF is in bootstraploader mode. This is indicated by a flashing RDY LED. **(4)** Another application program is accessing to the CIF the same time as SyCon. **Remedy:** **(1A)** Use polling mode instead of interrupt mode. Shared interrupts are not supported from the CIF device driver under Windows® 95/ Windows® 98/ Windows® ME/ Windows® NT. **(1B)** Use a free interrupt. **(2)** Download the configuration. If necessary create a new configuration. **(3)** First download the firmware and then download the configuration. **(4)** Close all other application programs that communicates to the CIF.
2026	Message handler: Wait for Delete
2027	Message handler: No cyclic Message

Table 55: Error Numbers of the Message Handler of the Online Data Manager (2010 .. 2027)

7.4.3 Driver Functions Error Numbers

The following table lists the error numbers of the Driver Functions of the Online Data Manager.

Error Number	Description
2501	Online Data Manager Sub DLL not found
2502	Function missing
2503	'Read Thread' not created
2504	'Write Thread' not created
2505	'IO Thread' not created
2510	Function failed
2512	Assign reports error. Return neither OK or cancel

Table 56: Error Numbers of the Driver Functions of the Online Data Manager (2501 .. 2512)

7.4.4 Online Data Manager Subfunctions Error Numbers

The following table lists the error numbers of the Subfunctions of the Online Data Manager.

Error Number	Description
8001	Driver not opened. E.g. CIF Device Driver
8002	Application has requested an unknown event
8003	Application has requested an unknown command
8004	Command has failed
8005	Command active
8006	Device invalid
8010	No device was assigned
8011	Device was already assigned
8020	Driver not connected
8021	Driver already connected
8030	Faulty 'GetState'
8031	Send error (PutMessage returns error)
8032	Send active (PutMessage active)
8033	Receive error (GetMessage returns error)
8034	Receive active (GetMessage active)
8035	IO Error (Exchange IO returns error)

Table 57: Subfunction Error Numbers of the Driver Functions of the Online Data Manager (8001 .. 8035)

7.5 Data Base Functions Error Numbers

The following table lists the error numbers of the converting functions.

Error Number	Description
4000	File does not exist
4001	Success in compromising
4002	Dataset does not exist
4003	Last respectively first entry reached
4004	Not enough memory
4005	File directory full
4006	Max number of entries reached
4007	No writing to this table possible, because the table is located in the FLASH
4008	Table name does already exist
4009	File name does not exist
4010	Free RAM length from RCS_CNF.P86 is smaller than E_F_INDEX * 2
4011	Parameter ‘next’ wrong
4012	Not enough free space to copy data set
4013	Set is deleted
4014	Value for Index is wrong
4015	Access not allowed
4016	open_file used before init_file
4017	Drive is not ready
4018	Not enough drive memory
4019	File name or path does not exist
4020	Cannot create path
4021	Wrong path
4022	Wrong flag
4023	The delete path is the root path
4024	Path file exists
4025	Write error during write a file
4026	Error during create a file
4027	Error during close a file
4028	No DBM file
4029	Length of the read data is unequal of the file length

Table 58: Error numbers of converting functions (4000 .. 4029)

Error Number	Description
4030	Path too long
4031	Directory changed
4032	Directory created
4034	Length of converting stream is 0
4035	Non equal data set found
4036	Non equal data set found
4037	Non equal data set found
4038	Data set has length 0
4039	The function DbmInit has assigned a Zero pointer during RCS initialization
4040	Printer not ready
4041	The data base is used from another function
4042	New length of data base is smaller than used
4043	Unknown access mode
4044	Old data base has to be converted
4045	Error while converting. Function not known
4046	Unknown type in set 0 found
4047	No float function available
4048	Function not in RCS module
4049	Check failed
4050	Checksum check failed
4051	More segments are existing in file, than in the structure FILE_INFO_T in wMaxEntries
4052	SegLen in structure FILE_INFO_T is smaller then the length in the file. Return of function dbm_restore_data
4053	The header file holds an other information for a length than in the segment itself
4054	Not enough memory for allocation on the PC
4055	No index for file handle in structure FLASH_DIR of RCS found
4057	File type 2 can not be printed because of too many definitions
4058	The definitions need too many lines to display them, than in the program available
4059	An unknown format for the parameter. Valid is U, H, or S
4060	Unknown parameter type

Table 59: Error numbers of converting functions (4030 .. 4060)

Error Number	Description
4061	The data base was transmitted into the FLASH
4062	Set 0 contains no structure definition
4063	Set 0 can not be deleted
4064	Error during execution of a ODBC data base access
4065	Initialization of DBM through RCS had no success
4066	Passed data length incorrect
4067	Sorting function not linked
4068	Error in function parameter
4069	Error from ODBC table
4070	No free handle available. Too many data base links are already opened
4071	Unknown data type found in the table
4072	Structure of table GLOBAL not correct or no such table existing
4073	No name of an ACCESS data base
4074	Download window can’t be created
4075	Download not fully performable

Table 60: Error numbers of converting functions (4061 .. 4075)

Error Number	Description
4082	More than 32 tables should be created
4083	No entry in element szSourceFile
4084	ODBC connection initialization not possible. This could happen when in file ODBCINST.INI in section [Microsoft Access Driver (*.mdb)] is no valid path to ODBCJT16/32.DLL.
4085	Error in structure in the ACCESS data base that is in DBM format
4086	Error in structure in the ACCESS data base that is in DBM format
4087	No data in a ODBC table
4088	No entry
4089	ODBC set length not valid
4090	Not enough data sets in ODBC table
4091	Table Create Tab not found
4092	Error in structure of table CreateTab
4093	No entry in element szSourceTable
4094	No entry in element szDestTable
4095	Entry in iSourceType of table CreateTab is wrong
4096	Entry in iTranslate of table CreateTab is wrong
4097	Function SQLAllocStmt reports an error
4098	ODBC source table not found
4099	ODBC data truncated
4100	Download timeout
4101	Library load error
4102	Library function error
4103	Error in description 'toggle'
4104	Error in description 'KB'
4105	Column does not exist
4106	ODBC structure different
4107	ODBC address error
4108	No CRC sum exists (table GLOBAL exists or old)
4109	Table GLOBAL is old
4110	Calculated CRC different to CRC in table GLOBAL
4199	Programming error

Table 61: Error numbers of converting functions (4082 .. 4199)

7.6 Converting Functions Error Numbers

The following table lists the error numbers of converting functions.

Error Number	Description
5000	Function PackLongToByteShort: Not enough space in pvD (Number of elements greater than reserved memory)
5001	Function PackLongToByteShort: Not enough space in pvD. Detected during converting of pvS
5002	Function PackLongToByteShort: Not enough space in pvD
5003	Function StringToByte: Not enough space in pvD
5004	Function IntToByte: Not enough space in pvD
5005	Function LongToShort: Not enough space in pvD
5006	Function PackStringDumpToByteArray: Not enough space in pvD
5007	Function PackStringBumpToByteArray: A character was found, which is not convertible into a HEX value
5008	Function PackStringDumpToByteArray: Number of character odd
5009	Function PackStringDumpToByteArray: Not enough space in pvD
5010	Function PackStringDumpToByteArray: The current data set needs to be appended the previous one
5011	Function PackStringDumpToByteArray: No corresponding function to the given number exist
5012	Converting error

Table 62: Error Numbers of data base functions (5000 .. 5012)

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9 Glossary

DTM

Device Type Manager

The Device Type Manager (DTM) is a software module with grafical user interface for the configuration and/or for diagnosis of devices.

FDT

Field Device Tool

FDT specifies an interface, in order to be able to use DTM (Device Type Manager) in different applications of different manufacturers.

Master

PROFIBUS Master devices initiate the data traffic on the bus. In the PROFIBUS protocol Master devices are called active participants. A master may send messages without external request.

Slave

Slave devices are peripheral devices, like for example I/O devices or drives. Slave devices are also called passive participants. They do not receive the bus access authorization. That means, they may only accept received messages from the Master or send a message to the Master after enquiry of the Master.

Operating Instruction Manual

Generic Slave DTM for PROFIBUS-DP Slave Devices

Configuration of PROFIBUS-DP Slave Devices

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ABB STOTZ-KONTAKT GmbH
Eppelheimer Straße 82
D-69123 Heidelberg
Germany

Tel.: +49(0)6221/701-0

Hotline Tel.: +49(0)6221/701-1444
Hotline Fax: +49(0)6221/701-1382

Email Hotline: Desst.helpline@de.abb.com

Web: www.abb.de/sto

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5	06.02.06	2.0.0.3 APBGenSlaveDTM.dll	1, 2, 3, 4, 5	actualised

Although this program has been developed with great care and intensively tested, ABB STOTZ-KONTAKT GmbH cannot guarantee the suitability of this program for any purpose not confirmed by us in writing.

Guarantee claims shall be limited to the right to require rectification. Liability for any damages which may have arisen from the use of this program or its documentation shall be limited to cases of intent.

We reserve the right to modify our products and their specifications at any time in as far as this contribute to technical progress. The version of the manual supplied with the program applies.

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1 Introduction

1.1 About PROFIBUS Generic Slave DTM

This manual describes how to set up PROFIBUS-DP Slave devices (PROFIBUS DPV0 and DPV1), which are described with GSD files. These devices can be configured with FDT Frameworks.

If you use such a device in your configuration, you will find a description about the single device parameters and diagnosis functions in this manual according to the PROFIBUS specification. The presentation is universal, but manufacturer specific particularities are possible.

1.2 Requirements

Requirements for working with a PROFIBUS-DP Generic Slave DTM are:

- Installed FDT Framework
- Installed PROFIBUS Master DTM
- Open Project
- Teh DTM need to be loaded in the Device Catalog

Loading GSD Files

To work with the Slave DTMs, the GSD file of the device has to be copied into the GSD folder in the installation directory of the DTM.

Now the Device Catalog has to be reloaded to make the devices available in the FDT Framework by means of the DTM.

1.3 Dialog Structure of the PROFIBUS Generic Slave DTM

The dialog window of the DTM is divided in three different areas:

- A header which contains the **General Device Information**.
- The **Pages Tree-View**.
- The **Configuration, Device Description and Diagnosis Pages**.

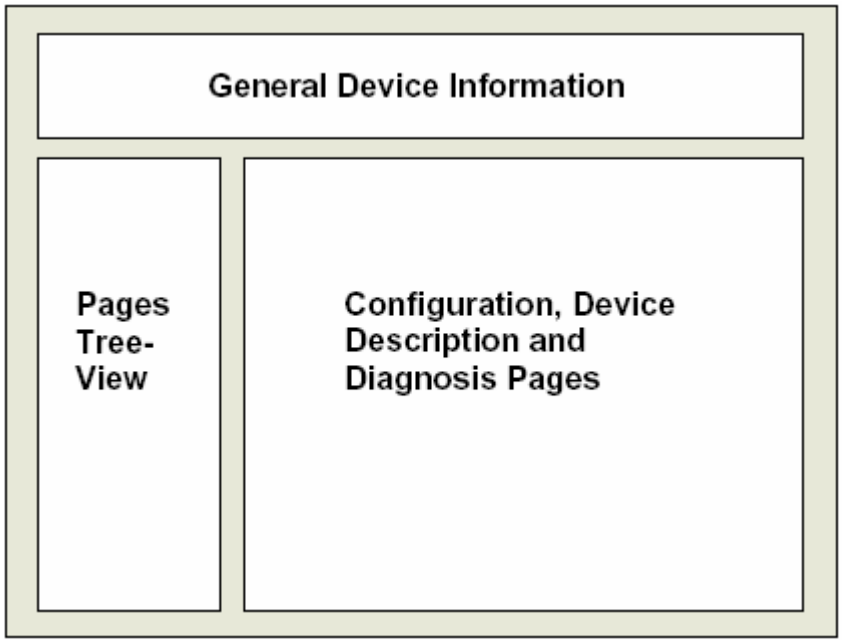

Figure 1: Dialog Structure of PROFIBUS Generic Slave DTM

1.3.1 General Device Information

The general device information contains specifications to the device. This indication is only for information and can not be edited

The indicated information is **IO Device** (name of the device), the **Vendor**, the **Device ID** and the **Vendor ID**.

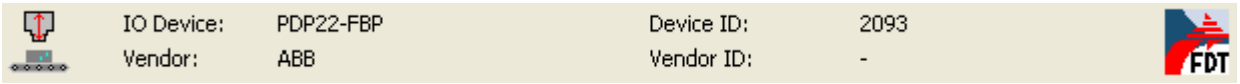

Figure 2: General Device Information

1.3.2 Pages Tree-View

The left side of the DTM dialog window shows the pages tree-view:

Figure 3: Pages Tree-View Configuration and Device Description

Configuration	
General	At the page **General** the actual **Station Address** of the Slave device is displayed and can be changed if necessary. Further information to this you find in section *General* on page *12*.
Modules	At the **Modules** page modules can be selected or assigned and configured. Further information to this you find in section *Modules* on page *13.*
Parameters	The **Parameter** page allows it to change the parameter settings of the modules. A detailled description you find in section *Parameter* on page *16.*
Groups	At the page **Groups** the single Slaves devices can be assigned to up to eight different, after a Master was arranged. Further information to this you find in section *Groups* on page *17.*
Extensions	The **Extensions** page contains adjustment possibilities for the extension parameters: Auto Clear, Fail Safe Behaviour, Configuration Data Convention, Error on Cyclic Data Exchange and Diagnosis update delay. Further information to this you find in section *Extensions* on page *18.*
DPV1	The **DPV1** page gives access to the DPV1 functions for an acyclic data exchange and to the functions read write and alarm handling. information to this you find in section *DPV1* on page *19.*
Device Description	
Device	The **Device Info** page contains the manufacturer information about the device. Further information to this you find in section *Device* on page *22.*
GSD	By use of the **GSD-Viewer** an GSD file can be searched through. Further information to this you find in section *GSD* on page 22.

Table 1: Overview Configuration and Device Description Pages

Note: To open the diagnosis pages the slave DTM must be connected to the master DTM. Further informationen to this you find in section *Online to the Device* on page *29*.

1.3.3 Configuration, Device Description and Diagnosis Pages

On the configuration, device description and diagnosis pages the device specific settings and the configuration can be made. These one can be edited by entering parameter values or via pull-down menus. On the diagnosis pages diagnosis information out of or to the device can be red and displayed. Therefore a connection to the device is required.

Detailed information to the single pages you can find below in this manual. Subsequently the sections with the descriptions to the single configuration, device description and diagnosis pages for the ABB PROFIBUS Slave DTM are listed.

Configuration

Contents	Page
General	*12*
Modules	*13*
Parameter	*16*
Groups	*17*
Extensions	*18*
DPV1	*19*

Table 2: Configuration Pages

Device Description

Contents	Page
Device	*22*
GSD	*22*

Table 3: Device Description Pages

Diagnosis

Contents	Page
Diagnosis	*24*
Extended Diagnosis	*26*

Table 4: Diagnosis Pages

1.4 Status Bar

The Status Bar displays information about the current state of the DTM. The meaning of the icons is explained in the following:

Figure 4: Status Bar

Number	Meaning	
1	Name of the Master DTM manufacturer: ABB Stotz-Kontakt GmbH	
2	Connection State Icon closed = Device is online Icon not closed = Device is offline	
3	Offline data: The displayed data are read out from the configuration file (database).	
	Online data: The displayed data are read out online from the device.	
4	Configuration was changed This symbol indicates, that the configuration was changed and these changes have not been saved until yet. When saving the actual configuration, this symbol expires.	
5	Diagnosis is activated	
6	The status of the device is displayed first as icon (6) and below it is indicated in plain text (7). The following states can appear:	
	Info	
	Warning	
	Error	

Table 5: Elements of the Status Bar

1.5 Dialog Buttons

OK

If it is confirmed with **OK**, the settings are stored and the dialog is closed.

Cancel

Clicking the **Cancel** button it is asked to confirm the loss of all modifications made before. If changes at the configuration were made, a safety inquiry follows whether the changes are to be stored or not. Subsequently, the dialog is closed.

Apply

The modifications are stored temporary to the frame applications database when clicking the **Apply** button. The dialog remains opened.

Reset

By means of the **Reset** button changes in the configuration of the frame application are rejected.

Help

For the configuration and diagnosis of the DTM a help file is available. This is opened by clicking the **Help** button.

Activating / Deactivating Options

To activate an option set a hook into the checkbox.

To deactivate an option remove the hook from the checkbox.

☐ Activated / ☑ deactivated

2 Configuration

2.1 Overview Configuration

Device settings and the assignment of the Slave modules are carried out in the **Configuration** dialog.

Pages Tree-View **Configuration** for the PROFIBUS Generic Slave DTM:

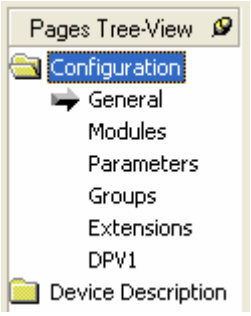

Figure 5: Pages Tree-View - Configuration

Descriptions to the configuration pages for the PROFIBUS Generic Slave DTM:

Contents	Page
General	*12*
Modules	*13*
Parameter	*16*
Groups	*17*
Extensions	*18*
DPV1	*19*

Table 6: Configuration Pages

2.2 General

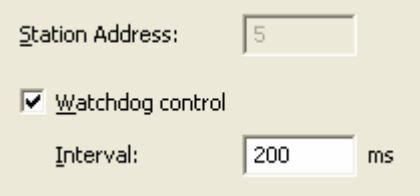

Figure 6: Configuration > General

At the page **Configuration > General** the actual **Station Address** of the Slave device is displayed and can be changed if necessary.

The setting **Watchdog control** activates or deactivates in the Slave the monitoring of communication errors to the assigned DP Master. If the DP Slave detects an interruption of an already operational communication, defined by the Watchdog time, then the Slave sets the outputs into the secure condition.

Caution: When the monitoring by means of the **Watchdog control** has been deactivated, it is possible that the outputs are not set into a safe state by the Slave, even though the communication has been interrupted.

In the field **Interval** the monitoring time of the selected Slave device is set. If the time chosen for this is too short for a low baud rate, then it is possible that the Slave will set its outputs into the safe state. If the time chosen is too long, it is possible that if an interruption occurs, the Slave will take a long time to set its outputs into the safe state.

2.3 Modules

At the page **Modules** modules can be selected or assigned and configured.

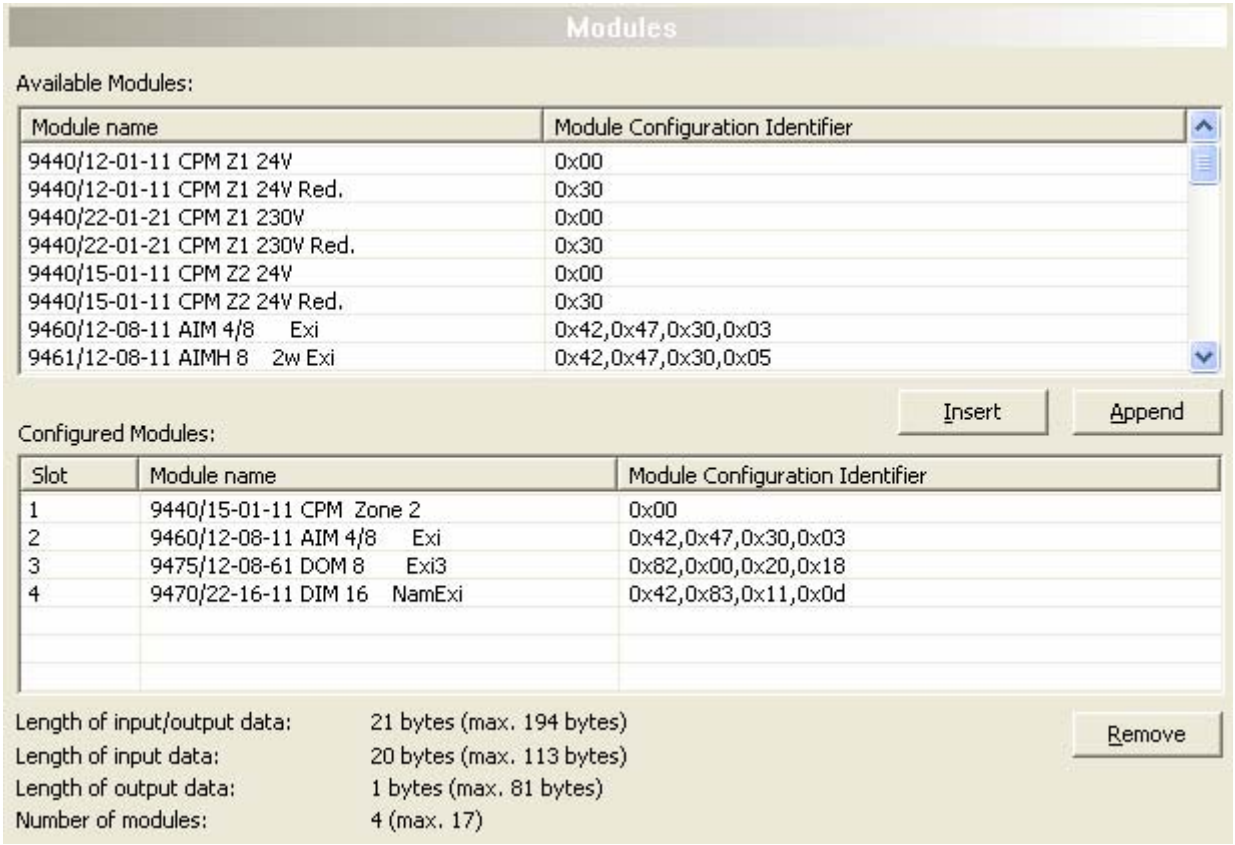

Figure 7: Configuration > Modules

There are two kinds of Slaves. A **simple Slave** has a fixed data length. The data length of a **modular Slave** is configurable. The selection list **Available Modules** shows all possible modules of the Slave.

- **Module Configuration of a simple Slave**

In the case of a simple Slave, one module is shown and it is copied automatically into the list Configured Modules.

- **Module Configuration of a modular Slave**

In case of a modular Slave, the user has to select the required modules manually.

If a module consists of several sub-modules, all Identifier of the sub modules are displayed in the column **Module Configuration Identifier** in the same row.

A description of the Module Configuration Identifier you find in section *Identifier Bytes* on page *38*.

The **Slot** column shows a sequential number for modules.

Configuration of the Modules of a Slave

For configuration of the modules of a Slave (selection of the modules), proceed as follows:

1. Insert all the required modules from the selection list **Available Modules** into the list **Configured Modules**. There are several possibilities to select available modules. This is described in section *Select Available Modules* on page *14*.

The sequence of the modules in the list **Configured Modules** is important and must match with the sequence which exists in the Slave. Typically, the sequence is the actual physical sequence. There are Slaves to which this rule does not apply and where for example first analogue modules and then digital modules must be entered, independent of their actual sequence.

For further information about the modules of the used Slave see the manual of the device manufacturer.

Note: If the Slave device has only one module, this module is taken over automatically in the table **Configured Modules** and can not be deleted.

2. Click on the **OK** button to confirm your selection. If the selection should not be taken over, click the **Cancel** button.

2.3.1 Select Available Modules

There are several possibilities to select an available module and insert it in the list **Configured Modules**:

Possibility	Procedure
Double Click on available Module	Select a module by clicking on it in the list **Available Modules** and with a double click on this module it appears as last module in the list **Configured Modules**.
Via Drag and Drop	Select a module by clicking on it in the list **Available Modules** with the left mouse button and draw it in the list **Configured Modules** by holding the mouse button.
'Insert' Button	Select a module by clicking on it in the list **Available Modules**. With a mouse click on the **Insert** button, this module appears in the list **Configured Modules** in the last selected row.
'Append' Button	Select a module by clicking on it in the list **Available Modules**. With a mouse click on the **Append** button, the selected module is appended as last module in the list **Configured Modules.**

Table 7: Select Available Modules

Note: A multiselection is possible. That means several modules can be selected in the list **Available Modules** by holding the SHIFT key and inserted in the list **Configured Modules.**

2.3.2 Delete Configured Modules

To delete a configured module from the list **Configured Modules**, there are several possibilities:

Possibility	Procedure
Double Click on a configured Module	Select a module by clicking on it in the list **Configured Modules** and delete it from the list by a double click.
'Delete' Button	Select a module by clicking on it in the list **Configured Modules**. With a mouse click on the **Delete** button the selected module will be deleted from the list **Configured Modules**.

Table 8: Delete Configured Modules

2.4 Parameter

The page **Parameter** allows it to change the parameter settings of the modules.

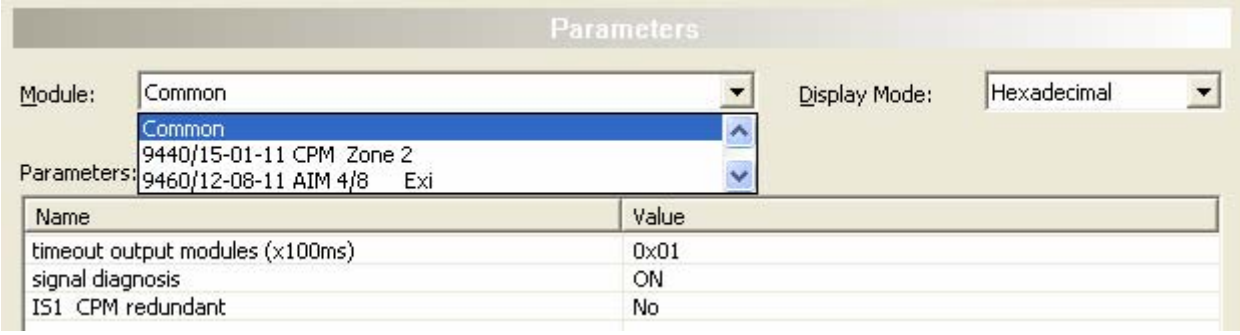

Figure 8: Configuration > Parameter

If default parameters are available in the GSD file of the Slave, they are automatically inserted.

Some of the DP Slave devices require further Parameter data, for instance in order to change a measuring limit or a value range. This type of data is manufacturer and slave specific. The meaning of the parameters is determined by the device manufacturer. The explanations can be taken from the manufacturers' manual.

- **Module**

  In the **Module** field the module which should be displayed has to be selected. The modules have to be assigned in the **Configuration** before (see section *Configuration* on page 11).

- **Parameter and Value**

  The Values of the Parameters can be changed by making a double click on the parameter.

  The meaning of the single Parameters can be found in the manual of the device manufacturer.

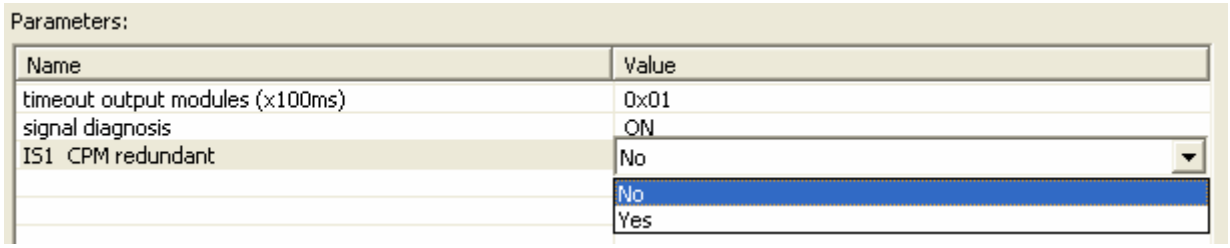

Figure 9: Change Parameter Values

The **Representation** of the parameter values is by default in hexadecimal representation. If in the drop down list **Display Mode** the item 'Decimal' is selected, the representation changes into the decimal representation.

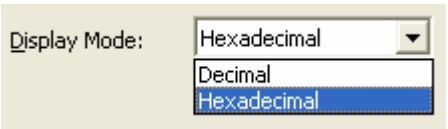

Figure 10: Decimal Representation of the Parameter Values

2.5 Groups

After a Master was arranged, the single Slaves devices can be assigned to up to eight different **Groups**.

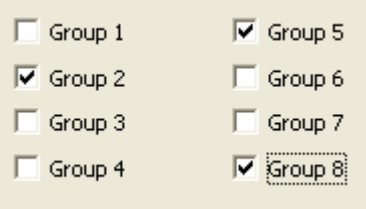

Figure 11: Configuration > Groups

The assignment of the actual Slave device to one or more groups takes place by enabling the group respectively groups with the desired characteristics.

The selected group membership is transferred to the Slave device during its start-up sequence. The group membership acts as a filter for the Sync and Freeze global commands. These are output as Broadcast telegrams in order to synchronize the input and output data of several Slaves. Only the Slaves in whose group these commands have been assigned react on it.

2.6 Extensions

The **Extensions** page contains adjustment possibilities for the extension parameters: Auto Clear, Fail Safe Behaviour, Configuration Data Convention, Error on Cyclic Data Exchange and Diagnosis update delay.

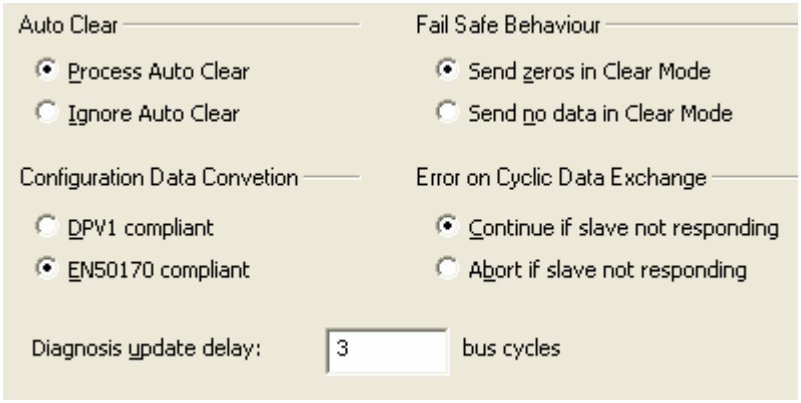

Figure 12: Configuration > Extensions

Setting	Description
Auto Clear	The setting **Auto Clear** activates or respectively deactivated the Auto Clear Function of the actual Slave. This function can only be used, if the global Auto Clear is activated in the Master. The setting of the global Auto Clear is typically configured in the Bus Parameters of the Master. If no data exchange occurs to at least one Slave (Process Auto Clear) or an existing data exchange takes place after the expiration of a monitoring time, then the Master leaves the data exchange and sets the outputs of **all** assigned DP Slaves into a secure condition. If the setting **Ignore Auto Clear** is selected, the Master tries to stay in the data exchange with the other Slaves.
Fail Safe Behaviour	This mode indicates to the Master that the affected Slave is working in a so-called Fail_Safe mode. If the mode is activated, the Master will send in the condition CLEAR instead of the zero output data, output data of length zero. On the basis of this process, the Slave immediately recognizes that the Master is in the CLEAR condition even if a previous CLEAR command was destroyed on the Bus.
Configuration Data Convention	The **Configuration Data Convention** determines whether the configuration data are interpreted according to **EN 50170** or **DPV1**.
Error on Cyclic Data Exchange	If the option **Continue if Slave not responding** is selected, the Master remains in the state DATA_EXCHANGE and holds the connection to the Slave. When **Abort if Slave not responding** is chosen, the Master does not remain in the DATA_EXCHANGE condition for the affected Slave if the Slave has been recognized as incorrect, but breaks off the connection to the Slave.
Diagnosis update delay	Some Slave devices which are newer require more time for the consistency testing for the processing of the SET_PRM parameter zing telegrams. In this case the standard diagnosis cycle is not sufficient after the parameterizing phase, to detect the disposition of the Slave for the DATA_EXCHANGE. With the diagnosis delay, the number of diagnosis cycles is advanced after the parameterizing phase, which is the maximum that the Master waits for this disposition, before it starts a new parameterizing. The value range is 0..255.

Table 9: Configuration > Extensions

2.7 DPV1

DPV1 serves for an acyclic data exchange and supports the functions read write and alarm handling.

Note: DPV1 functions can only be used and configured, if the used DP Master supports DPV1 functions.

Enable DPV1

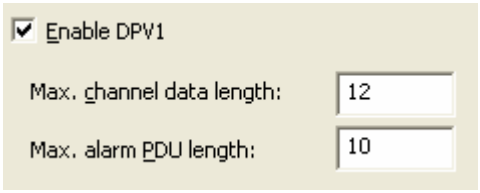

Figure 13: Configuration > DPV1 > Enable DPV1

The option **Enable DPV1** has to be enabled, to activate DPV1. All setting possibilities concerning DPV1 are grayed out before activating.

Note: In case of Slave devices which do not support DPV1, the **Enable DPV1** field is grayed out and can not selected for this Slaves.

The **Max. channel data length** determines the maximum length of the DPV1 Alarm telegrams. The Slave will arrange its buffer size for the concerning number of data.

The **Max. alarm PDU length** determines the maximum quantity of active alarms.

Alarms

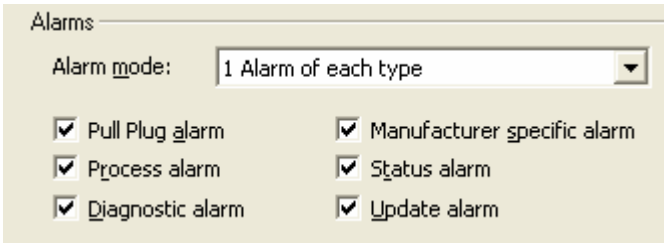

Figure 14: Configuration > DPV1 > Alarms

The **Alarm mode** defines the maximum number of possible active alarms: 1 alarm of each type respectively 2, 4, 8, 12, 16, 24 or 32 alarms in total.

The following alarms can be activated or deactivated by selecting it or not.

- Pull Plug alarm (module pulled),
- Process alarm,
- Diagnosis alarm,
- Manufacturer specific alarm,
- Status alarm and
- Update alarm.

Extra Alarm SAP

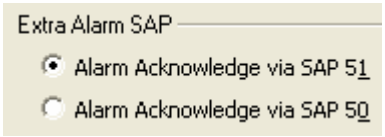

Figure 15: Configuration > DPV1 > Extra Alarm SAP

It the field **Extra Alarm SAP** it is set, if the DPV1 Master acknowledges an alarm to the DPV1 Salve via **SAP 51** or **SAP 50**.

3 Device Description

3.1 About Device Description

Pages Tree-View **Device Description** for the PROFIBUS Generic Slave DTM:

Figure 16: Pages Tree-View - Device Description

Descriptions to the configuration pages for the PROFIBUS Generic Slave DTM:

Contents	Page
Device	*22*
GSD	22

Table 10: Device Description Pages

3.2 Device

The **Device Info** dialog contains manufacturer information about the device, which is defined in the GSD file. The following information is indicated:

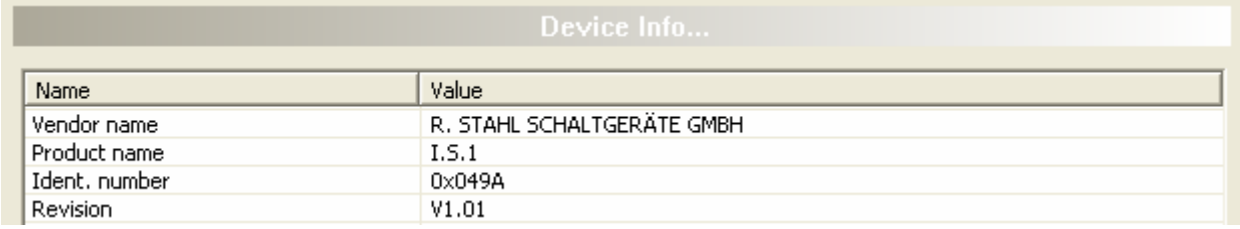

Figure 17: Device Description - Device

3.3 GSD

The **GSD Viewer** shows the content of the GSD file in a text view.

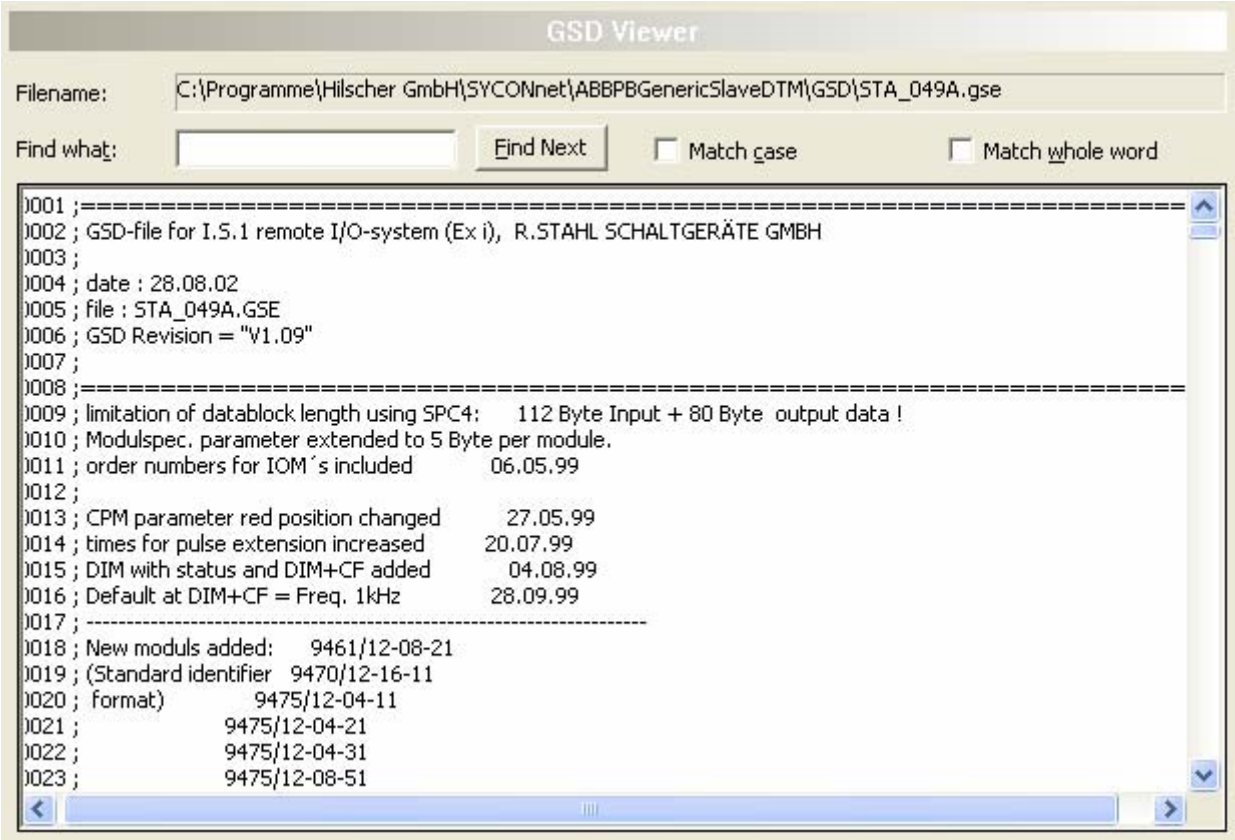
GSD Viewer
Filename:
C:\Programme\Hilscher GmbH\SYCONnet\ABBPBGenericSlaveDTM\GSD\STA_049A.gse
Find what:
Find Next
Match case
Match whole word
)001 ;==========
)002 ; GSD-file for I.S.1 remote I/O-system (Ex i), R.STAHL SCHALTGERÄTE GMBH
)003 ;
)004 ; date : 28.08.02
)005 ; file : STA_049A.GSE
)006 ; GSD Revision = "V1.09"
)007 ;
)008 ;==========
)009 ; limitation of datablock length using SPC4: 112 Byte Input + 80 Byte output data !
)010 ; Modulspec. parameter extended to 5 Byte per module.
)011 ; order numbers for IOM´s included 06.05.99
)012 ;
)013 ; CPM parameter red position changed 27.05.99
)014 ; times for pulse extension increased 20.07.99
)015 ; DIM with status and DIM+CF added 04.08.99
)016 ; Default at DIM+CF = Freq. 1kHz 28.09.99
)017 ; ----------
)018 ; New moduls added: 9461/12-08-21
)019 ; (Standard identifier 9470/12-16-11
)020 ; format) 9475/12-04-11
)021 ; 9475/12-04-21
)022 ; 9475/12-04-31
)023 ; 9475/12-08-51

Figure 18: Device Description - GSD

On the left side, the line number is displayed for simple overview, the further entries show the GSD file in text format.

Furthermore under **Filename** the file directory path and the file name of the GSD file is displayed. **Find what** offers a search feature to search for text contents within the text of the GSD file.

4 Diagnosis

4.1 Overview Diagnosis

Pages Tree-View **Diagnosis** for the PROFIBUS Generic Slave DTM:

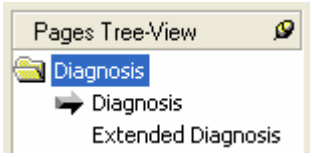

Figure 19: Pages Tree-View - Diagnosis

Descriptions to the diagnosis pages for the PROFIBUS Generic Slave DTM:

Firmware Diagnosis	Page
Diagnosis	*24*
Extended Diagnosis	*26*

Table 11: Diagnosis Pages

Built Online Connection

Note: To call up the diagnosis pages an online connection from the Slave DTM to the Master DTM is needed.

Information on how to build up an online connection from the Slave DTM to the Master DTM is described in section *Online to the Device* on page *29*.

4.2 Diagnosis

Detailled information about the diagnosis of a DP Slave device you find in section *DP Slave Diagnosis* on page *31*.

The diagnosis information of a DP Slave can be 6 to 244 bytes. The first 6 bytes are standard Diagnosis information (specification). The meaning of these 6 bytes is according to the PROFIBUS specification and contains the **Station Status**, the **Assigned Master Address** and the **Device internal Ident Number** of the Slave.

The Extended Device Diagnosis starts at the 7th Byte. It is manufacturer specific and can contain, station related diagnosis, module related diagnosis and/or channel related diagnosis.

The range of the displayed diagnosis bytes can be restricted by the used DP Master.

The following figure shows the analysis of the first 6 byte of the standard diagnosis.

Figure 20: Diagnosis

Diagnosis	Description
Station Status	The Station Status 1, 2 and 3 in detail are described in section *Station Status of the Slave Diagnosis* on page *31*.
Assigned Master Address	At **Assigned Master Address** the address of the master is shown, that has parameterized and configured this Slave. The value 255 displays, that the Slave is not parameterized or configured yet or that the received parameter information and configuration information are rejected because of an error.
Device internal Ident Number	In the field **Device internal Ident Number** the (real) ident number of the used Slave is displayed. If the **Device internal Number** shows the value 0000, the master still has no connection via the PROFIBUS to the DP Slave.
Update	Actualizes the displayed diagnosis states.

Table 12: Diagnosis

Note: The **Device internal Ident Number** has to agree with the **Ident Number of the GSD file** (see section *General Device Information* on page 6). When they are different the reason could be that the wrong GSD file is used or a wrong DP Slave was connected to the PROFIBUS.

4.3 Extended Diagnosis

Note: The extended diagnosis is only activated if the Slave device supports the extended diagnosis.

The **Extended Diagnosis** helps to find bus and configuration errors.

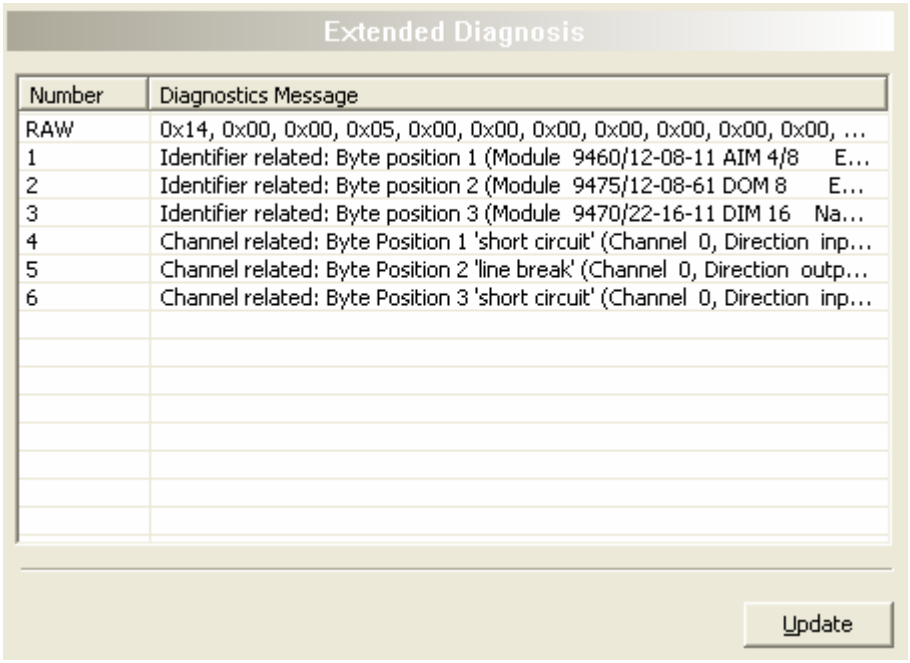
Extended Diagnosis
Number
Diagnostics Message
RAW
0x14, 0x00, 0x00, 0x05, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, ...
1
Identifier related: Byte position 1 (Module 9460/12-08-11 AIM 4/8 E...
2
Identifier related: Byte position 2 (Module 9475/12-08-61 DOM 8 E...
3
Identifier related: Byte position 3 (Module 9470/22-16-11 DIM 16 Na...
4
Channel related: Byte Position 1 'short circuit' (Channel 0, Direction inp...
5
Channel related: Byte Position 2 'line break' (Channel 0, Direction outp...
6
Channel related: Byte Position 3 'short circuit' (Channel 0, Direction inp...
Update

Figure 21: Extended Diagnosis

This field shows a list of **extended Diagnosis Messages**. The first entry in this list, characterized with RAW contains the undecoded extended diagnosis data (Ext_Diag_Data) of the actual Slave.

The following rows contain three categories of messages:

- Device related
- Identifier related
- Channel related

The **Device related diagnosis** contains manufacturer specific information about the status of the device.

The **Identifier related diagnosis** indicates in which module a diagnosis is present. The **Byte position** gives the relevant **Module Configuration Identifier** and the name of the associated module.

The **Cannel related diagnosis** gives information about diagnosed channels and diagnosis causes. The **Byte position** gives the relevant **Module Configuration Identifier** and the channel type.

A detailed description about the device related, identifier related and channel related diagnosis can be found in the sections given in the following table:

Diagnosis	Section	Page
Device related diagnosis	*Device Related Diagnosis*	*34*
Identifier related diagnosis	*Identifier Related (Module) Diagnosis*	*35*
Channel related diagnosis	*Channel Related Diagnosis*	*36*

Table 13: Extended Diagnosis

Note: An analysis of the extended device diagnosis can only takes place, if texts are provided for the analysis in the GSD by the device manufacturer.

5 Online to the Device

5.1 Connect/Disconnect

To call up and to use the diagnosis pages, it is necessary, that an online connection from the Slave DTM to the Master DTM exists.

- **Build up Connection**

Note: An online connection from the Slave DTM to the Master DTM can only built up when a driver is assigned to the Master device.

An online connection from the Slave DTM to the Master DTM can built up via the command **Connect** in the context menu of the Slave DTM.

- **Disconnect**

The online connection from the Slave DTM to the Master DTM can be disconnected via the command **Disconnect** in the context menu of the Slave DTM.

6 Appendix

6.1 DP Slave Diagnosis

A PROFIBUS DP Master can read out diagnosis information of a DP Slave. The diagnosis telegram contains standard diagnosis and as the case maybe extended diagnosis.

Standard Diagnostic 6 Byte	Extended Diagnostic (if available)

Table 14: DP Slave Diagnosis

The **Standard Diagnosis** of the first 6 Byte for DP Slave devices is described in section *Station Status of the Slave Diagnosis* on page *31*.

If an **Extended Diagnosis** is available for this device, you find a description in section *Extended Slave Device Diagnosis* on page *34*.

6.1.1 Station Status of the Slave Diagnosis

6.1.1.1 The meaning of Station Status 1

Station-Status 1	Set by	Meaning and Remedy
Master lock (Bit 7)	Master	**Meaning:** The Slave has already been parameterized by another Master and is locked in its access. **Remedy:** This is security mechanism of PROFIBUS-DP. First clarify which master should have access to this Slave. Then add this Slave to the configuration of the master that should have access to this Slave and remove this Slave from the configuration of the other master.
Parameter fault (Bit 6)	Slave	**Meaning:** This bit is set by the Slave automatically, when the parameters sent by the Master are containing wrong or insufficient data. On every received parameter telegram the Slave executes a check routine on the whole parameter telegram. If the Slave detects a faulty parameter value or illegal data during its check, it will report the **Parameter fault**. During the check routine the Slave compares its ident number with the one sent by Master. **Remedy:** So if the Slave reports this error, first compare the **Device internal Number** with the **GSD Ident Number**. If they are different, either a wrong GSD file is used or a wrong device was connected to the bus. If this two Ident numbers are the same, check the parameter data
Invalid Slave response (Bit 5)	Master	**Meaning:** This bit is set by the Master, when the Master receives an invalid answer from the Slave. So the physical contact to the Slave works principally, but the logical answer was not understood. **Remedy:** An error at the physical transmission line could have appeared like twisted cable, missing bus termination or missing shield connection. Use standardized DP Slave. This also can happen, for example if a PROFIBUS-FMS Slave is connected to the DP-Master instead of a DP Slave. So the Slave does not understand the DP-Telegram and rejects it. It's handled as 'Invalid Slave Response'.

Table 15: PROFIBUS-DP Diagnosis Station state 1 (Bit 7 to 5)

Station-Status 1	Set by	Meaning and Remedy
Function not supported (Bit 4)	Slave	**Meaning:** This bit is set by the Slave, when a function should be performed which is not supported. Newer releases of Slave stations normally support the Sync and Freeze-Mode for I/O data. This is fixed in the GSD-File and read out by SyCon and sent to the Slave in the parameter telegram. **Remedy:** If this error occurs the GSD-File declares at least one of these commands as supported, but the Slave does not. In this case contact the manufacturer of the Slave device for the right GSD-File for the used Slave.
Extended Diagnosis (Bit 3)	Slave	**Meaning:** This bit is set by the Slave, if extended diagnosis data are a read out. Extended diagnosis data is optionally and normally used by a Slave to hand out manufacturer specific diagnosis information. **Remedy:** Click on the button **Extended Diagnosis** to get a Hex-dump of the diagnosis data and read about their meaning in the manual of the manufacturer. If the GSD-File contains information about the Extended Device Diagnosis it can be analyzed with the DTM.
Configuration fault (Bit 2)	Slave	**Meaning:** During the PROFIBUS-DP startup procedure the Slave compares its internal I/O configuration with the configuration of the Master. If the Slave detects differences it will report a configuration error. That means that the Master has another I/O module constellation as the Slave. **Remedy:** So first compare visually all configured I/O modules in the configuration data of SyCon for this Slave with its real physical constellation. Note that the order of the module has to agree. Some Slaves need virtual I/O modules to be configured first or empty slot modules to get an even number of modules to run. This Slave specific I/O module behaviour has to be written down in the Slave documentation because it can not be read out from the GSD file. Please read the configuration notes of the manufacturer.
Station not ready (Bit 1)	Slave	**Meaning:** The DP Slave is still not ready for the data exchange. **Remedy:** When or at which event the Slave sets this bit is not defined in the specification. That means it can have several Slave specific reasons. Usually the bit is set in combination with one the other fault bits. Check especially the parameter and the configuration. Often the report **Station not ready** results in case of parameter fault or configuration faults. It is possible that the supply voltage at the Slave was just first switched on. Wait until the device is initialized.
Station not existent (Bit 0)	Master	**Meaning:** This bit is set by the Master automatically, if this Slave does not answer or is not reachable on the bus. **Remedy:** Please check your PROFIBUS cable. Both signal wires need to be connected correctly between all devices. In addition the connectors at the end of the cable need to be provided with termination resistors. Check that the device is connected to the bus cable. Check the power supply at the Slave device. Compare the station address at the Slave with the configuration of the Master. Check, if the Slave supports the configured baud rate. Some Slaves only work with up to 1.5 MBaud or need to be set for a PROFIBUS-DP conform behaviour. Check the intermediated LWL (optical) connector's converters and repeaters.

Table 16: PROFIBUS-DP Diagnosis Station state 1 (Bit 4 to 0)

6.1.1.2 The meaning of Station State 2

Station-Status 2	Set by DP	Meaning
Slave deactivated (Bit 7)	Master	This bit is set by the Master, if the Slave in its parameter set is marked as inactive, so that it is taken out from the cyclic I/O exchange.
Reserved (Bit 6)	-	-
Sync Mode (Bit 5)	Slave	This bit is set by the Slave, when it has received the Sync control command.
Freeze Mode (Bit 4)	Slave	This bit is set by the Slave, when is has received the Freeze control command.
Watchdog on (Bit 3)	Slave	This bit is set by the DP-Slave, when its Watchdog control is active to supervise its corresponding Master connection.
Slave device (Bit 2)	Slave	This bit is always set by the Slave.
Static Diagnosis (Bit 1)	Slave	The Slave sets this bit to indicate the Master to be not operative because of a general error. Typically the DP Slave is not ready for an I/O data transfer. In a case of a set Static Diagnosis bit the Master has to collect diagnosis information as long as this bit is active. On which events or at what time this bit can be set by a Slave device, is not defined in the norm description and can not be mentioned here.
Parameteri-zation request (Bit 0)	Slave	The Slave sets this bit to force the Master system to do a new parameterization. This bit is set as long as new parameterization must be performed. In case of this error you should compare firstly the **Device internal Ident Number** with the **GSD ident number** in this window. This numbers need to be the same. Furthermore you have to check the parameter data.

Table 17: PROFIBUS-DP Diagnosis Station State 2

6.1.1.3 The meaning of Station State 3

Station-Status 3	Set by	Meaning
Extended diagnosis overflow (Bit 7)	Master Slave	This bit is set, if there is more extended diagnosis information to report to the Master than can be given to the Master in one diagnosis telegram. The DP-Slave sets this bit for example if there is more diagnosis channel information than the Slave can hold down in its diagnosis buffer.
Reserved (Bit 6 to 0)	-	-

Table 18: PROFIBUS-DP Diagnosis Station State 3

6.1.1.4 Master Address

This byte of the standard diagnosis shows the address of the DP Master which has parameterized the DP Slave and which has read and write access to the DP Slave. The value 255 (FFH) displays that the DP Slave was not parameterized or faulty parameterized by the DP Master.

6.1.1.5 Ident Number

The Ident Number is the manufacturer code of the DP Slave device.

6.1.2 Extended Slave Device Diagnosis

6.1.2.1 Device Related Diagnosis

This extended diagnosis is referred to the device. The length of the device related diagnosis comprises min 2 to max 63 bytes.

2 .. 63 Bytes			
Headerbyte	2. Byte	...	63. Byte
	Manufacturer specific		

Table 19: Device Related Diagnosis

The meaning of the Headerbyte is shown in the following table. The meaning of the following 1 to max. 62 diagnosis bytes is fixed by the device manufacturer. For further analysis the ident number and the device description of the manufacturer are necessary.

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
								Block length in bytes including header byte 2 to header byte 63
								Bit 7, Bit 6 fixed to 00

Table 20: Device Related Diagnosis (Headerbyte)

6.1.2.2 Identifier Related (Module) Diagnosis

This extended diagnosis is referred to the module (identifier byte). The length of the identifier related diagnosis comprises min 2 to max 63 bytes.

2 .. 63 Bytes					
Headerbyte	**7 .. 0**	**15 .. 8**	**23 .. 16**	**31 .. 24**	**...**

Table 21: Identifier Related (Module) Diagnosis

For each used identifier byte at the configuration one bit is reserved. It is padded to byte limits. The bits which are not configured are set to zero. A set bit means there is diagnosis for this module (identifier byte).

Header Byte

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
								Block length in bytes including header byte 2 to header byte 63
								Bit 7, Bit 6 fixed to 00

Table 22: Identifier Related (Module) Diagnosis (Headerbyte)

Bit structure for identifier related diagnosis

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
								Identifier byte 0 has diagnostic
								Identifier byte 1 has diagnostic
								...
								Identifier byte 7 has diagnostic

Table 23: Identifier Related (Module) Diagnosis (Bit structure)

6.1.2.3 Channel Related Diagnosis

This extended diagnosis is referred to a channel.

Byte 1 Identifier Number	Byte 2 Channel Number	Byte 3 Type of Diagnostic

Table 24: Channel Related Diagnosis

The length per entry is 3 bytes. In this block the diagnosed channels and the diagnosis reason are entered in turn. Several blocks with channel related diagnosis can appear.

Byte 1: Identifier Number

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
		Identifier Number 0 to 63						
		Bit 7, Bit 6 fixed to 00						

Table 25: Byte 1: Identifier Number

Byte 2: Channel Number

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
		Channel Number 0 to 63						
		Input / Output 00 reserved 01 Input 10 Output 11 Input / Output						

Table 26: Byte 2: Channel Number

For identifier bytes which contain both input and output, the direction of the diagnosed channel is indicated in bit 7 and bit 6 of the cannel number.

Byte 3: Type of Diagnosis

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
								Error Type (described in the following table)
								Channel Type 000 reserved 001 Bit 010 2 Bit 011 4 Bit 100 Byte 101 Word 110 2 Words 111 reserved

Table 27: Byte 3: Type of Diagnosis

Error Type	Description
0	reserved
1	short circuit
2	undervoltage
3	overvoltage
4	overload
5	overtemperature
6	line break
7	upper limit value exceeded
8	lower limit value exceeded
9	error
10	reserved
...	...
15	reserved
16	manufacturer specific
...	...
31	manufacturer specific

Table 28: Error Type

6.2 Identifier Bytes

In the configuration telegram identifier bytes are used. The meaning of them is specified in the PROFIBUS specification.

The following table is an overview.

	Value		Meaning			
GIF/SIF	0x00	00	free place			
	0x01-0x0F	01-15	see SIF			
GIF	0x10-0x1F	16-31	1-16	Byte	Input	Consistency over Byte
GIF	0x20-0x2F	32-47	1-16	Byte	Output	Consistency over Byte
GIF	0x30-0x3F	48-63	1-16	Byte	Input/Output	Consistency over Byte
	0x40-0x4F	64-79	see SIF			
GIF	0x50-0x5F	80-95	1-16	Word	Input	Consistency over Word
GIF	0x60-0x6F	96-111	1-16	Word	Output	Consistency over Word
GIF	0x70-0x7F	112-127	1-16	Word		Consistency over Word
	0x80-0x8F	128-143	see SIF			
GIF	0x90-0x9F	144-159	1-16	Byte	Input	Consistency over whole length
GIF	0xA0-0xAF	160-175	1-16	Byte	Output	Consistency over whole length
GIF	0xB0-0xBF	176-191	1-16	Byte		Consistency over whole length
	0xC0-0xCF	192-207	see SIF			
GIF	0xD0-0xDF	208-223	1-16	Word	Input	Consistency over whole length
GIF	0xE0-0xEF	224-239	1-16	Word	Output	Consistency over whole length
GIF	0xF0-0xFF	240-255	1-16	Word		Consistency over whole length

Table 29: Identifier bytes (overview)

6.2.1 Identifier Bytes (General Identifier Format GIF)

For the identifier bytes in general identifier format the following table shows the meaning.

MSB							LSB	
7	6	5	4	3	2	1	0	**Meaning**
								Bit 3 to 0: Length 0000 = 1 Byte or 1 Word 0001 = 2 Byte or 2 Word ... 1111 = 16 Byte or 16 Word
								Bit 5 and 4: Input/Output 00 = special identifier format (SIF) 01 = Input 10 = Output 11 = Input and Output
								Bit 6: Format 0 = Byte 1 = Word
								Bit 7: Consistency over 0 = Byte or Word 1 = whole length

Table 30: Identifier Bytes (General Identifier Byte Format GIF)

	Value		**Meaning**			
GIF/SIF	0x00	00	Free place			
SIF	0x01 – 0x0F		see SIF			
GIF	0x10	16	1	Byte	Input	Consistency over Byte
GIF	0x11	17	2	Byte	Input	Consistency over Byte
GIF	...	...	...	Byte	Input	Consistency over Byte
GIF	0x1F	31	16	Byte	Input	Consistency over Byte
GIF	0x20	32	1	Byte	Output	Consistency over Byte
GIF	0x21	33	2	Byte	Output	Consistency over Byte
GIF	...	...	...	Byte	Output	Consistency over Byte
GIF	0x2F	47	16	Byte	Output	Consistency over Byte
GIF	0x30	48	1	Byte	Input/Output	Consistency over Byte
GIF	0x31	49	2	Byte	Input/Output	Consistency over Byte
GIF	...	...	...	Byte	Input/Output	Consistency over Byte
GIF	0x3F	63	16	Byte	Input/Output	Consistency over Byte
SIF	0x40 – 0x4F		see SIF			
GIF	0x50	80	1	Word	Input	Consistency over Word
GIF	0x51	81	2	Word	Input	Consistency over Word
GIF	...	...	...	Word	Input	Consistency over Word
GIF	0x5F	95	16	Word	Input	Consistency over Word
GIF	0x60	96	1	Word	Output	Consistency over Word
GIF	0x61	97	2	Word	Output	Consistency over Word
GIF	...	...	...	Word	Output	Consistency over Word
GIF	0x6F	111	16	Word	Output	Consistency over Word
GIF	0x70	112	1	Word	Input/Output	Consistency over Word
GIF	0x71	113	2	Word	Input/Output	Consistency over Word
GIF	...	...	...	Word	Input/Output	Consistency over Word
GIF	0x7F	127	16	Word	Input/Output	Consistency over Word
SIF	0x80 – 0x8F		see SIF			
GIF	0x90	144	1	Byte	Input	Consistency over whole length
GIF	0x91	145	2	Byte	Input	Consistency over whole length
GIF	...	...	...	Byte	Input	Consistency over whole length
GIF	0x9F	159	16	Byte	Input	Consistency over whole length

Table 31: Identifier Bytes 0x10 .. 0x3F, 0x50 .. 0x7F, 0x90 .. 0x9F (GIF)

	Value		Meaning			
GIF	0xA0	160	1	Byte	Output	Consistency over whole length
GIF	0xA1	161	2	Byte	Output	Consistency over whole length
GIF	...	...	...	Byte	Output	Consistency over whole length
GIF	0xAF	175	16	Byte	Output	Consistency over whole length
GIF	0xB0	176	1	Byte	Input/Output	Consistency over whole length
GIF	0xB1	177	2	Byte	Input/Output	Consistency over whole length
GIF	...	...	...	Byte	Input/Output	Consistency over whole length
GIF	0xBF	191	16	Byte	Input/Output	Consistency over whole length
SIF	0xC0 – 0xCF		see SIF			
GIF	0xD0	208	1	Word	Input	Consistency over whole length
GIF	0xD1	209	2	Word	Input	Consistency over whole length
GIF	...	...	...	Word	Input	Consistency over whole length
GIF	0xDF	223	16	Word	Input	Consistency over whole length
GIF	0xE0	224	1	Word	Output	Consistency over whole length
GIF	0xE1	225	2	Word	Output	Consistency over whole length
GIF	...	...	...	Word	Output	Consistency over whole length
GIF	0xEF	239	16	Word	Output	Consistency over whole length
GIF	0xF0	240	1	Word	Input/Output	Consistency over whole length
GIF	0xF1	241	2	Word	Input/Output	Consistency over whole length
GIF	...	...	...	Word	Input/Output	Consistency over whole length
GIF	0xFF	255	16	Word	Input/Output	Consistency over whole length

Table 32: Identifier Bytes 0xA0 .. 0xBF, 0xD0 .. 0xFF (GIF)

6.2.2 Special Identifier Byte Format (SIF)

The special identifier byte format (SIF) is an extension of the general identifier byte format and offers more flexibility. Also manufacturer specific information can be used with it.

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
								Bit 0 to 3: Length of manufacturer specific data according to the length byte for In- and/or Output In case of DDLM_Chk_Cfg: 0000 = no manufacturer specific data follow 0001 = 1 manufacturer specific data follow ... 1110 = 14 manufacturer specific data follow 1111 = no manufacturer specific data follow In case of DDLM_Get_Cfg: 0000 = no manufacturer specific data follow 0001 = 1 manufacturer specific data follow ... 1110 = 14 manufacturer specific data follow 1111= not allowed
								Bit 5 and 4: solid 00 = solid
								Bit 7 and 6: Input/Output 00 = free place 01 = a length byte for Input follows 10 = a length byte for Output follows 11 = a length byte for Input and Output follows

Table 33: Special Identifier Format (SIF)

Length Byte

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
								Bit 0 to 5: Length 000000 = 1 Byte or 1 Word 000001 = 2 Byte or 2 Word ... 111111 = 64 Byte or 64 Word
								Bit 6: Format 0 = Byte 1 = Word
								Bit 7: Consistency over 0 = Byte or Word (element) 1 = whole length

Table 34: Length Byte of the SIF

	Value		Meaning
GIF/SIF	0x00	00	free place
GIF	0x01 – 0x0E	01 – 14	free place and 1-14 manufacturer specific data
GIF	0x0F	15	free place and no manufacturer specific data
GIF	0x40	64	1 length byte Input
GIF	0x41 – 0x4E	65 – 78	1 length byte Input and 1-14 manufacturer specific data
GIF	0x4F	79	1 length byte Input and no manufacturer specific data
GIF	0x80	128	1 length byte Output
GIF	0x81 – 0x8E	129 – 142	1 length byte Output 1 and 1-14 manufacturer specific data
GIF	0x8F	143	1 length byte Output 1 and no manufacturer specific data
GIF	0xC0	192	1 length byte Output and 1 length byte Input
GIF	0xC1 – 0xCE	193 – 206	1 length byte Output, 1 length Input byte and 1-14 manufacturer specific data
GIF	0xCF	207	1 length byte Output, 1 length Input byte and no manufacturer specific data

Table 35: Special Identifier bytes 0x01 .. 0x0F, 0x40 .. 0x4F, 0x80 .. 0x8F, 0xC0 .. 0xCF (SIF)

Length Byte

Value		Meaning		
0x00 – 0x3F	00-63	1-64	Byte	Consistency over Byte
0x40 – 0x7F	64-127	1-64	Word	Consistency over Word
0x80 – 0xBF	129-191	1-64	Byte	Consistency over whole length
0xC0 – 0xFF	193-255	1-64	Word	Consistency over whole length

Table 36: Length byte of the special identifiers (SIF)

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8 Glossary

GSD

GSD = Gerätestammdaten

The 'Gerätestammdaten' describe the characteristics of a device type in a stipulated format. The GSD are created individually for each device type. And they are allocated in form of a GSD file for the user by the manufacturer of the device.

The project system can read in and consider the GSD for any PROFIBUS-DP device automatically because of the pegged file format during the configuration of the bus system.

FDT

Field Device Tool

FDT specifies an interface, in order to be able to use DTM (Device Type Manager) in different applications of different manufacturers.

Freeze

After receiving the control command FREEZE, the DP-Slave freezes the actual state of the Inputs and transmits them cyclically to the DP-Master. After each new control command FREEZE, the Slave freezes the state of the Inputs again. The actual Input data are not transmitted cyclically from the DP-Slave to the DP-Master until the DP-Master sends the control command UNFREEZE. The DP-Slave has to be assigned to a group for the control command FREEZE in the configuration.

DPV0

PROFIBUS-DP with cyclic communication

DPV1

PROFIBUS-DP with acyclic communication

DTM

Device Type Manager

The Device Type Manager (DTM) is a software module with grafical user interface for the configuration and/or for diagnosis of devices.

Sync

With the control command SYNC the DP-Master arranges the DP-Slave, that the DP-Slave freezes the states of the Outputs on the actual value. During the following telegrams the DP-Slave saves the Output data in each case, which it has save as Output data. The Outputs are first updated cyclically until the DP-Master sends the control command UNSYNC. The DP-Slave has to be assigned to a group for the control command SYNC in the configuration.

Operating Instruction Manual

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Device Configuration Ethernet

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ABB STOTZ-KONTAKT GmbH
Eppelheimer Straße 82
D-69123 Heidelberg
Germany

Tel.: +49(0)6221/701-0

Hotline Tel.: +49(0)6221/701-1444
Hotline Fax: +49(0)6221/701-1382

Email Hotline: Desst.helpline@de.abb.com

Web: www.abb.de/sto

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1 Introduction

1.1 About this Manual

This manual describes the use of the software component Ethernet ComPro DTM. According to the FDT/DTM specification a DTM represents a single device and/or a device class.

Descriptions of the Dialog Pages

The table below gives an overview for the dialog pages descriptions:

Section	Subsection	Manual Page
Settings	*Overview Settings*	*17*
	Firmware	*18*
	Driver	*19*
	Device Assignment	*22*
Configuration	*Overview Configuration*	*25*
Service	*Overview Service*	*31*
	Device	*32*
Diagnosis	*Overview Diagnosis*	*33*
	Firmware Reset and Task States	*34*

Table 1: Descriptions Dialog Pages

For an overview regarding to the content of the dialog pages refer to section *Dialog Pages Ethernet-ComPro DTM* on page 11.

Note: To display the folder **Configuration** in the navigation area, first a firmware needs to be loaded to the device. See section *Firmware* on page 18. Accessing the **Service** and **Diagnosis** pages of the Ethernet-ComPro DTM requires an online connection from the Ethernet-ComPro DTM to the device. For further information, refer to section *Connecting / Disconnecting Device* on page 49.

1.1.1 Help

➢ To open the help files, click on the **Help** button or press the F1 key.

1.2 Conventions in this Manual

Operation instructions, a result of an operation step or notes are marked as follows:

Operation Instructions:

➢ <instruction>

or

1. <instruction>
2. <instruction>

Results:

➪ <result>

Notes:

Note: <note>

1.3 Legal Notes

1.3.1 Disclaimer

Although this program has been developed with great care and intensively tested, ABB STOTZ-KONTAKT GmbH cannot guarantee the suitability of this program for any purpose not confirmed by us in writing.

Guarantee claims shall be limited to the right to require rectification. Liability for any damages which may have arisen from the use of this program or its documentation shall be limited to cases of intent.

We reserve the right to modify our products and their specifications at any time in as far as this contribute to technical progress. The version of the manual supplied with the program applies.

1.3.2 Registered Trademarks

Windows® 2000/Windows® XP are registered trademarks of Microsoft Corporation.

1.4 About Ethernet-ComPro DTM

The Ethernet ComPro DTM is used for configuration and diagnosis of devices within a FDT frame application.

1.4.1 Requirements

System Requirements

- PC with 1 GHz processor or higher
- Windows® 2000/ Windows® XP
- Internet Explorer Version 5.5 or higher
- FDT/DTM V 1.2 compliant Frame Application
- Free disk space: min. 50 MByte
- CD ROM drive
- RAM: min. 256 MByte
- Graphic resolution: XGA (1024 x 768) or higher
- Keyboard and Mouse

Further conditions for using Ethernet ComPro DTM:

To configure a device with an Ethernet ComPro DTM the following requirements have to be accomplished:

- Completed hardware installation of a DTM-capable device
- Installed FDT Framework
- DTM of device loaded in the Device Catalog of the FTD Framework

1.5 Dialog Structure of the Ethernet-ComPro DTM

The graphical user interface of the DTM is divided in three main areas:

- A header with the **General Device Information**
- The **Navigation Area**
- The **Dialog Pages**

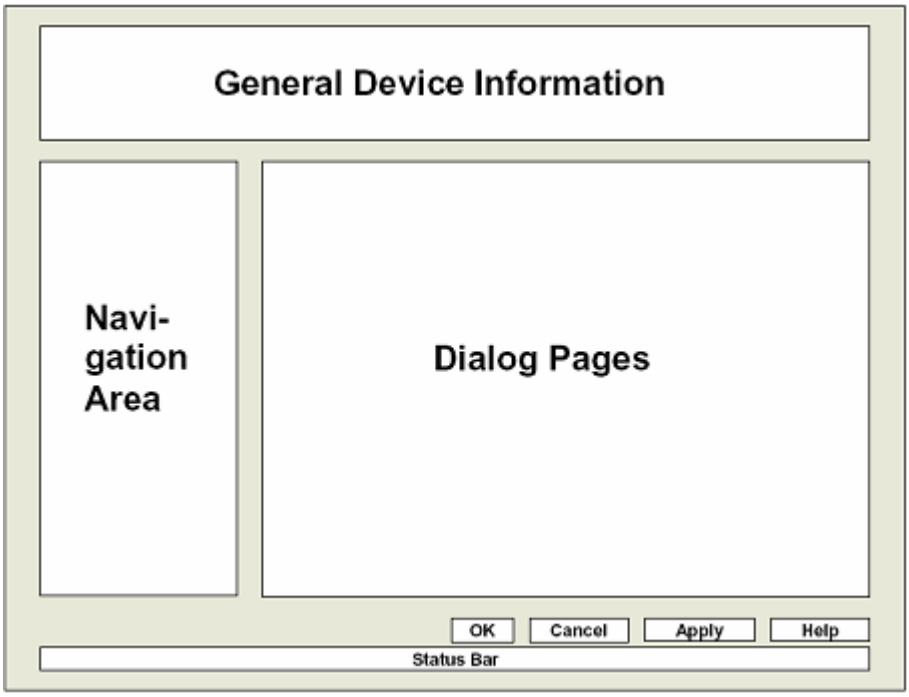


Figure 1: Dialog Structure of Ethernet-ComPro DTM

Additional information e. g. online-state of the DTM can be found in the **Status Bar**.

Explanations to general dialog elements like buttons and other controls can be found in the subsection *Controls and Dialog Buttons* on page 13.

1.5.1 General Device Information

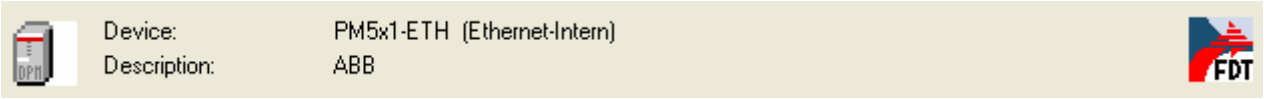


Figure 2: General Device Information

Parameter	Meaning
Device	Name of the device
Description	Vendor name of the device

Table 2: General Device Information

1.5.2 Navigation Area

The **Navigation Area** at the left side of the dialog offers a tree structure to navigate through the pages of the DTM.

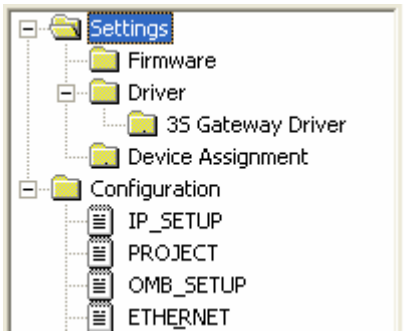


Figure 3: Navigation Area

➢ To access a DTM page select the respective item of the navigation tree structure.

1.5.3 Dialog Pages

The dialog pages show configuration or diagnostic dialogs.

Configuration Pages

In the configuration pages settings are made. The parameters displayed in the dialog are editable. Configuration pages are e. g. the dialog **Settings** > **Firmware**, **Settings** > **Device Assignment** or **Device**.

For further descriptions to this question refer to section *Configuring Device* on page 26.

Diagnostic Pages

Diagnostic pages are for example the **Task States** tables in the **Diagnosis** folder. These are shown for diagnostic purposes and can not be edited. For further descriptions to this question refer to section *Overview Diagnosis* on page 33.

1.5.4 Dialog Pages Ethernet-ComPro DTM

Settings	
Firmware	The dialog on the page **Firmware Download** is used to load a new firmware into the device. A detailed description can be found in section Firmware on page 18.
Driver	On the page **Driver** you can select a driver from the driver list. For further information, refer to section *Driver* on page 19.
Device Assignment	On the page **Device Assignment** you must assign the device. For further information, refer to section *Device Assignment* on page 22.
Configuration	
	This folder contains the **Parameter** of the opened configuration. The displayed parameters depend on the used firmware and can be edited in the corresponding sub menus. Further information about this you find in section *Configuration* on page 25.
Service	
Device	This folder shows the **Device information** as well as the **Available License** Codes for informational use and the function **Code Activation**. To use the **Service** functions the device needs to be connected because the displayed information is read out from the device. Further information about this you find in section *Service* on page 31.
Diagnosis	
Device	This folder contains the function **Reset Firmware** and displays the **Firmware name** and the **Firmware version** of the actual used firmware as well as the **Task States** of the actual selected protocol which are cyclically updated. The displayed task states depend on the selected firmware file and so the representation can vary. Further information about this you find in section *Diagnosis* on page 33.

Table 3: Overview Settings, Configuration, Service and Diagnosis Pages

Note: To display the folder **Configuration** in the navigation area, first a firmware needs to be loaded to the device. See section *Firmware* on page 18. Accessing the **Service** and **Diagnosis** pages of the Ethernet-ComPro DTM requires an online connection from the Ethernet-ComPro DTM to the device. For further information, refer to section *Connecting / Disconnecting Device* on page 49.

1.5.5 Controls and Dialog Buttons

In this section, you will find general information on controls and buttons.

1.5.5.1 General Buttons

The table below explains the general buttons in the DTM user interface.

Button	Meaning
OK	To confirm your latest settings, click on the **OK** button. All changed values will be applied on the frame application database. *The dialog then closes.*
Cancel	To cancel your latest changes, click on the **Cancel** button. Answer to the safety query that the changes are not to be stored. Then the changed values will not be applied on the frame application database. *The dialog then closes.*
Apply	To confirm your latest settings, click on the **Apply** button. All changed values will be applied on the frame application database. *The dialog remains opened.*
Help	To open the DTM online help, click on the **Help** button.

Table 4: General Buttons

1.5.5.2 Table Line Buttons

➢ To select, create or delete a line in a table use the buttons shown in the table below.

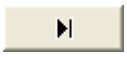
Button	Meaning
	To select the first line of a table use the button **First Line**.
	To select the previous line of a table use the button **Previous Line**.
	To select the next line of a table use the button **Next Line**.
	To select the last line of a table use the button **Last Line**.
	The button **Create a new Line** inserts new lines into the table.
	The button **Delete selected Line** deletes the selected line from the table.

Table 5: Table Line – Buttons

1.5.6 Status Bar

The **status bar** displays information about the current state of the DTM.

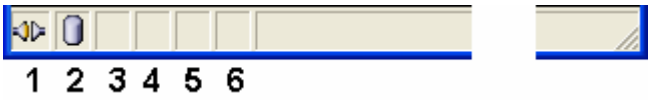


Figure 4: Status Bar

Number	Meaning	Icon
1	**DTM Connection State:**	
	Icon going closed = Device is going online	
	Icon closed = Device is online	
	Icon going opened = Device is going offline	
	Icon opened = Device is offline	
	Icon with lightening = Device communication disturbed	
2	**Data Source States**	
	The displayed data are read out from the instance data set (database).	
	The displayed data are read out from the instance data set (database). Database is locked with password.	
	The displayed data are read out from the device.	
	The displayed data are read out from the device. Device is locked with password.	
3	**States of the instance Date Set**	
	All data loaded	-
	Valid Modified = Parameter is changed (not equal) to data source.	
	Invalid Modified = Invalid value (e. g. not plausible)	
	Initial data set = Parameter value is equal to data source value (data base or field device).	-
4	**Changes directly made on the Device**	
	Changes have only an impact on the device and not on the instance data set. Instance data set and device may not be consistent any more.	
5	**Direct Mode active**	
6	**Device diagnosis status**	
	Failure: Output signal invalid due to malfunction in the field device or its peripherals.	
	Functional check: Output signal temporarily invalid (e.g. frozen) due to on-going work on the device.	
	Off-specification: Device is operating outside its specified range or internal diagnosis indicates deviations from measured or set values due to internal problems in the device or process characteristics.	
	Maintenance required: Although the output signals valid, the wear reserve is nearly exhausted or a function will soon be restricted due to operational conditions.	
	Output signal valid	
	Diagnosis deactivated	

Table 6: Status Bar Icons [1]

2 Getting Started

2.1 Configuration Steps

The following table describes the steps to configure a device with Ethernet ComPro DTM as it is typical for many cases. At this time it is presupposed that the hardware installation was done.

#	Action	Short Description	For detailed information see section	Page
1	Create new project / Open existing project	Create in CoDeSys a new project and start ABB SYCON.net, to open the project.	*Refer to the ABB CoDeSys manual.*	-
2	Load device catalog	For ABB netDevice select **Network > Device Catalog > Reload Catalog.**	*Refer to the netDevice user manual.*	-
3	Insert device into configuration	For ABB netDevice insert device via drag and drop **on the device bus line** in the window netDevice.	*Refer to the netDevice user manual.*	-
4	Open the netDevice configuration dialog	Open the dialog by double clicking to the device symbol.	-	-
5	Select firmware	Click the **Browse** button in the dialog **Settings > Firmware** and select a firmware file, then click **Open**	*Firmware*	*18*
6	Select driver	Select a driver in the dialog **Settings > Driver** and mark the appropriate checkbox.	*Driver*	*19*
7	Assign device	Assign the device in the dialog **Settings > Device Assignment** to this driver.	*Device Assignment*	*22*
8	Load firmware	Load the selected firmware into the device by selecting the **Download** button in the **Settings > Firmware** dialog	*Firmware*	*18*
9	Configure device	Configuration possibilities depend on selected firmware	-	-
10	Save project	For ABB SYCON.net select **File > Save**	-	-
11	Connect device	For ABB netDevice select **Device > Connect**	*Connecting / Disconnecting Device*	*49*
12	Download Configuration	For ABB netDevice select **Device > Download**	*Download Configuration*	*49*
13	Diagnosis	Select **Device > Configuration**, to open the diagnosis dialog. Select the item **Task State** (Task states depend on selected firmware) and see states for diagnosis information	*Diagnosis*	*33*
14	Disconnect	For ABB netDevice select **Device > Disconnect**	*Connecting / Disconnecting Device*	*49*

Table 7: Getting Started - Configuration Steps

3 Settings

3.1 Overview Settings

Descriptions of “Settings”

The table below gives an overview for the individual **Settings** dialog pages descriptions:

Section	Subsection	Manual Page
Firmware		*18*
Driver	*Selecting Driver*	*19*
	Configuring Driver	*20*
Device Assignment	*Scanning Devices*	*22*
	Assigning Device	*23*

Table 8: Descriptions Dialog Pages Settings

Settings Dialog Pages

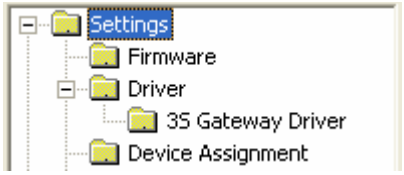


Figure 5: Navigation Area - Settings

Note: Under **Settings > Driver** the driver dialog pages are displayed. At the driver dialog pages settings for the drivers can be configured. For further information, please refer to the *Configuring Driver* section on page 20.

3.2 Firmware

Using the **Firmware** dialog a firmware can be transferred to the device.

➢ Select **Settings > Firmware** from the navigation area.

Note: For firmware download a device must be assigned to a driver (see section *Driver* on page 19).

➢ Select the **Browse** button.

➧ The dialog **Firmware Download** is displayed.

➢ Select a loadable firmware file and confirm your selection via the button **Open**.

➧ In the lower section of the dialog window **Select Firmware File** the following information is displayed: File name, File type, Recent folders and Firmware (version number).

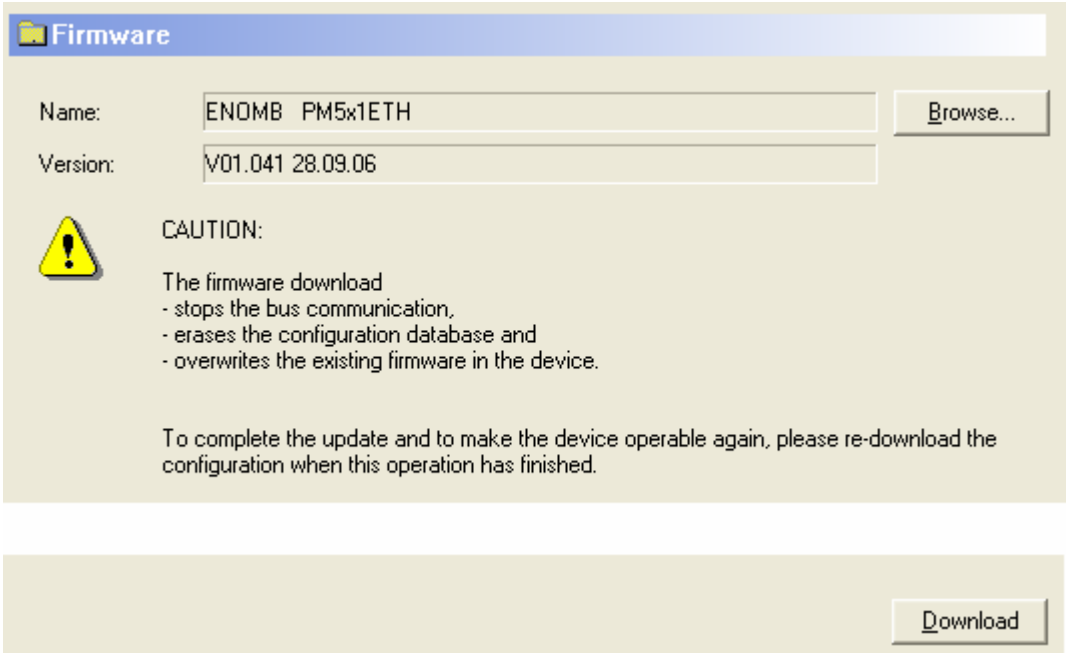

Firmware
Name:
ENOMB PM5x1ETH
Browse...
Version:
V01.041 28.09.06
CAUTION:
The firmware download
- stops the bus communication,
- erases the configuration database and
- overwrites the existing firmware in the device.
To complete the update and to make the device operable again, please re-download the configuration when this operation has finished.
Download

Figure 6: Firmware

➧ After opening the firmware file, the **Name** and the **Version** of the firmware are indicated in the upper section of the dialog.

To download the firmware:

➢ Select the **Download** button.

➧ A safety query appears, if the new firmware shall be downloaded to the device.

➢ Confirm this query with **Yes**.

3.3 Driver

The **Driver** dialog page displays the driver/s to be used for an Ethernet-ComPro DTM to device communication connection.

Note: The way the Ethernet-ComPro DTM will communicate with the later assigned device depends on the selected driver/s.

3.3.1 Selecting Driver

To establish a connection you need to select a driver first.

Note: You can only select drivers which are supported by the device and the Ethernet-ComPro DTM. Only these drivers will establish a connection from the Ethernet-ComPro DTM to the device.

To select the driver/s to be used:

➢ Select **Settings > Driver** in the navigation area.

➢ The available drivers are listed on the **Driver** dialog page.

Parameter	Meaning
Driver	Name of the driver
Version	Version of the driver
ID	ID of the driver

Table 9: Driver Selection List Parameters

➢ Mark the respective driver/s by clicking the appropriate checkbox at the left side of the selection list.

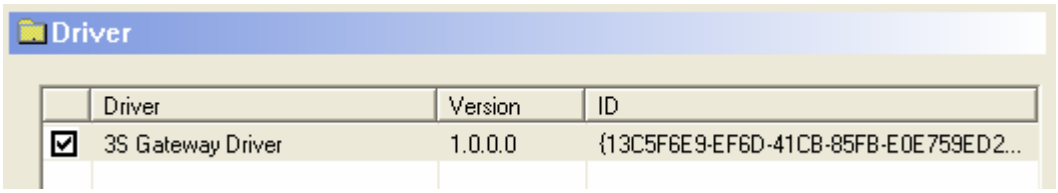


Figure 7: Driver Selection List - Driver/s selected

3.3.2 Configuring Driver

Under **Settings > Driver** the driver dialog pages are displayed. At the driver dialog pages settings for the drivers can be configured.

➢ To get detailed information to the single drivers and how to configure them, please refer to the corresponding driver description.

3.3.3 3S Gateway Driver

In the dialog window *3 S Gateway Driver* settings can be made on how the configurator can communicate with the device.

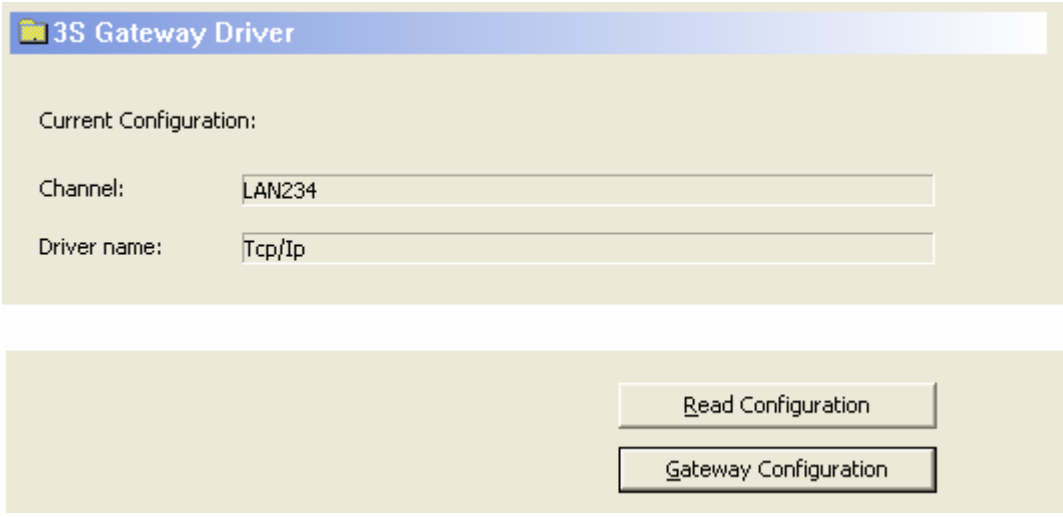


Figure 8: Settings > Driver > 3S Gateway Driver

Term in the dialog	Meaning
Current Configuration	Shows the current configuration of the 3 S Gateway driver.
Read Configuration	Actualizes the display under *Current Configuration*
Gateway Configuration	Opens the window *'Kommunikationsparameter'* (*Communication Parameters*, see figure *3S Gateway Driver - Communication Parameters* on page 21). The communication parameters for the driver configuration can be preset here.

Table 10: Description to the 3S Gateway Driver Dialog

In the window *'Kommunikationsparameter'* the communication parameters for the driver configuration can be adjusted.

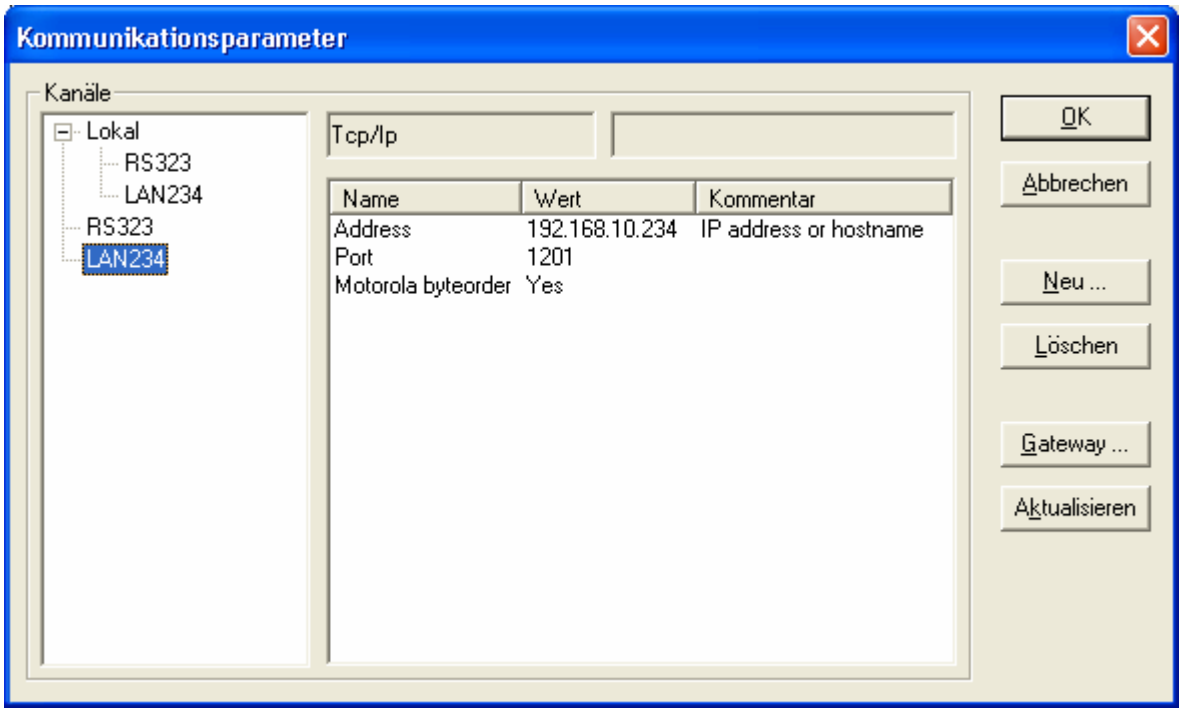


Figure 9: 3S Gateway Driver - Communication Parameters

Note: The detailed description to the dialogue window *Kommunikationsparameter* (communication parameter) is in the ABB manual "Systems Engineering of the CPUs/Coupler".

3.4 Device Assignment

On the **Device Assignment** dialog page you must assign the device.

Note: To establish a connection from the Ethernet-ComPro DTM to a device, you must assign a physical device to the Ethernet-ComPro DTM.

3.4.1 Scanning Devices

- Select **Settings** > **Device Assignment** in the navigation area.
- Start the scanning process by clicking on the **Scan** button.
- All devices that can be connected with the Ethernet-ComPro DTM via the preselected driver are displayed.

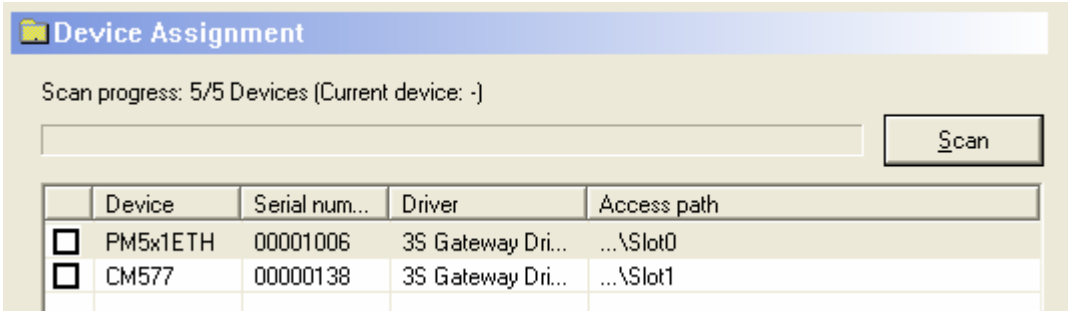


Figure 10: Device Assignment - detected Devices

Parameter	Meaning
Device name	Name of the device
Serial number	Serial number of the device
Driver	Name of the driver
Access Path	Access path to the device (or board number or IP address or COM interface)

Table 11: Device Assignment Parameters

3.4.2 Assigning Device

Note: A connection with the Ethernet-ComPro DTM can only be established with one device.

➢ To assign a driver to a device, mark the device/ driver required by clicking the appropriate checkbox at the left side of the selection list.

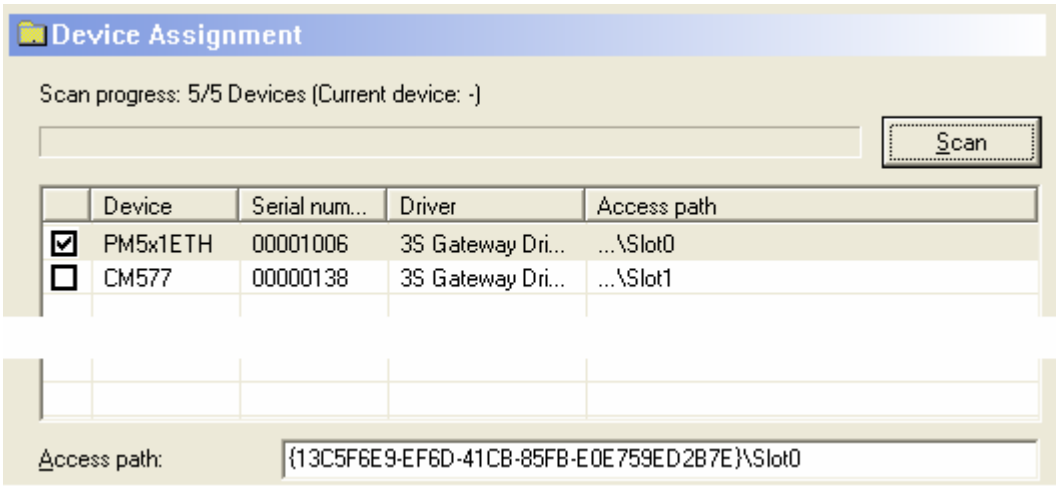


Figure 11: Device Assignment - Assigning Device

➢ Confirm the selection by clicking the **OK** or **Apply** button.

➢ The selected device is now connected to the Ethernet-ComPro DTM.

➢ To leave the **Device Assignment** dialog page without modifying the device configuration, click on the **Cancel** button.

4 Configuration

4.1 Overview Configuration

The device configuration is carried out in the dialog **Configuration**.

Descriptions of "Configuration"

The table below gives an overview for the individual **Configuration** dialog pages descriptions:

Subsection	Page of the Manual
IP_SETUP	*26*
Table PROJECT	*28*
OMB_SETUP Table	*29*
ETHERNET Table	*30*

Table 12: Dialog Pages Configuration

Configuration Dialog Pages

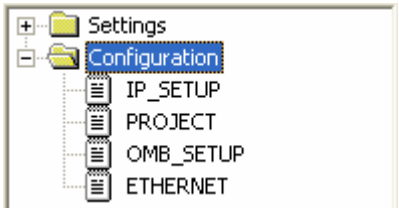


Figure 12: Navigation Area – Configuration

Note: To display the folder **Configuration** in the navigation area, first a firmware needs to be loaded to the device. For further information, refer to section *Firmware* on page 18.

For further information refer to section *Configuring Device* on page 26.

4.2 Configuring Device

For configuration of the device configuration dialogs or tables of the Ethernet-ComPro DTM are used.

4.2.1 Configuration Tables

The configuration tables are editable tables. The **Parameter**s (parameter names) are displayed in the left column and the corresponding **Value**s are shown in the right column. A value is assigned to every parameter.

The column **Parameter** is static. That means, the displayed names can not be changed and no parameter line can be deleted or added.

The entries in the column **Values** can be static or editable. The editable values can be changed by typing in or via a pull down menu, depending on the selected item in the navigation area and the displayed parameters and values.

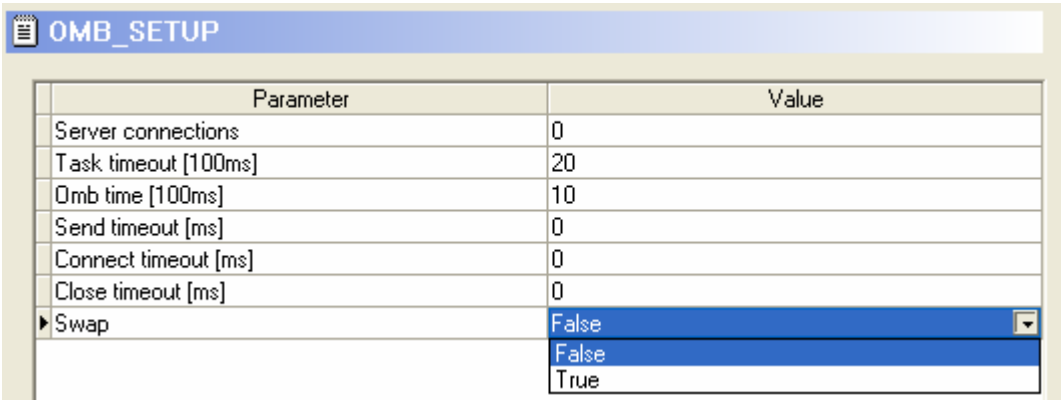


Figure 13: Example: Editable Configuration Table

4.2.2 IP_SETUP

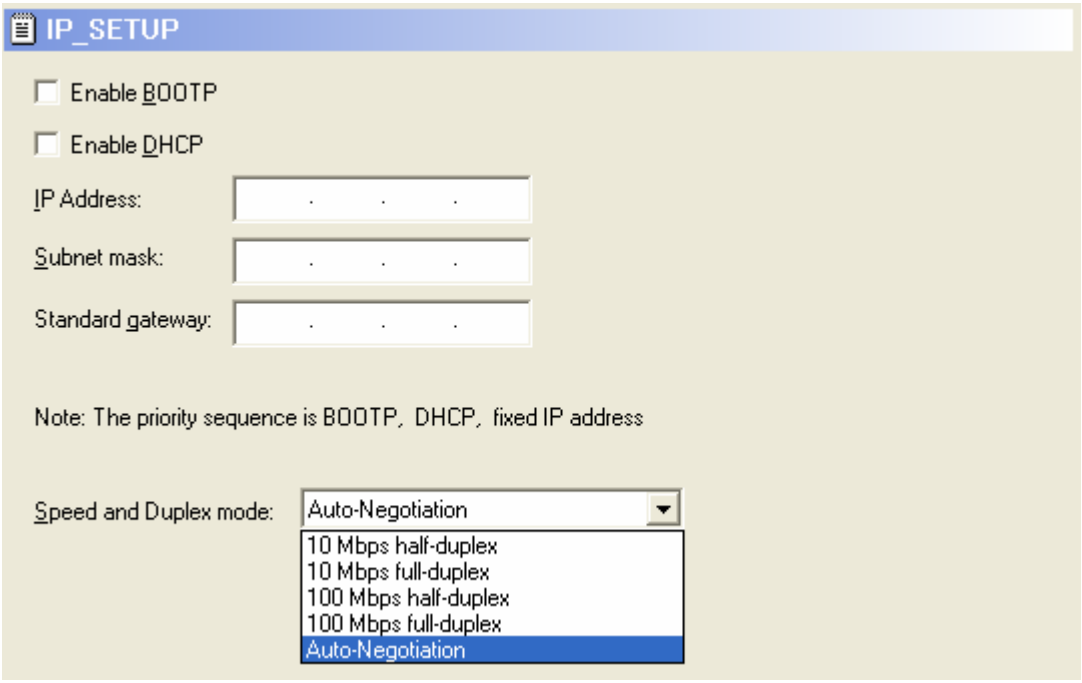


Figure 14: Device Configuration - IP_SETUP

Parameter	Meaning
Enable BOOTP	The device contains the IP parameter of a BOOTP Server.
Enable DHCP	The device contains the IP parameter of a DHCP Server.
IP address	In these fields the **IP address** of the device is entered. An IP address consists of 32 Bits (4 byte) and in each field 1 byte of the address is entered.
Subnet mask	In these fields the **Subnet mask** is entered. A subnet mask consists of 32 Bits (4 byte) and in each field 1 byte of the address is entered.
Standard gateway	In these fields the **Standard gateway** address is entered. A standrad gateway address consists of 32 Bits (4 byte) and in each field 1 byte of the address is entered.
Speed and Duplex mode	10 or 100 Mbps half- or full-duplex: The device operates in the half or full-duplex mode with a transmission rate of 10 MBit/s or 100 MBit/s. Auto-Negotiation: If this Bit is set, the device negotiates automatically the duplex mode and the data transmission rate with the hub or switch.

Table 13: Device Configuration - IP_SETUP

4.2.3 Table PROJECT

One table of the configuration is always **Project**. There the project information is shown and can be edited if necessary.

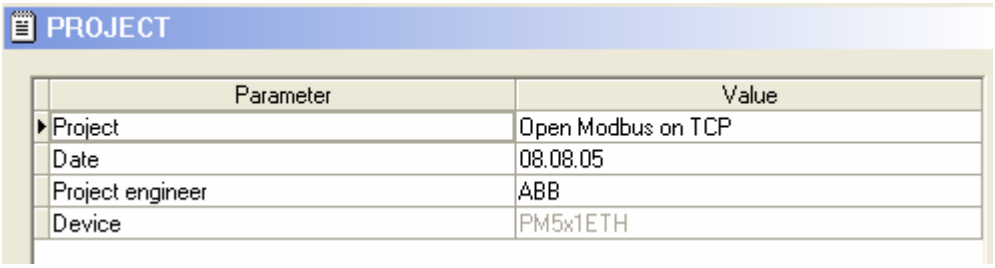


Figure 15: Device Configuration – Project

4.2.4 OMB_SETUP Table

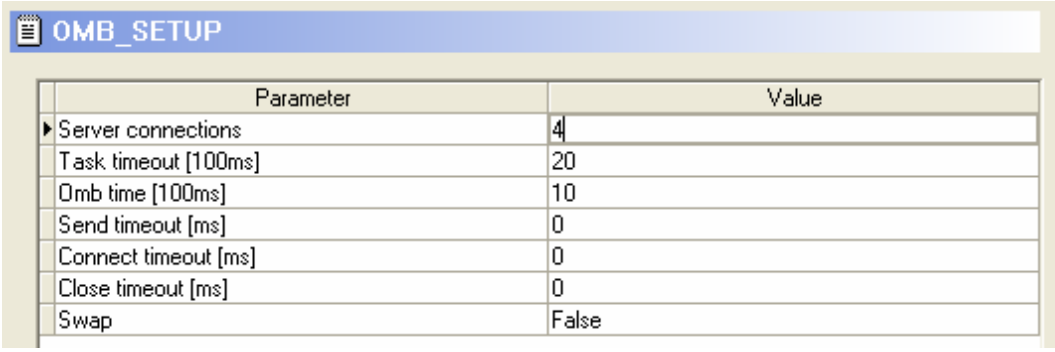


Figure 16: Device Configuration - OMB_SETUP

Parameter	Meaning	Range of Value
Server connections	Max. 16 Server connections can be set simultaneously.	0 ... **4** ... 16
Task timeout [100ms]	Only valid for Client orders in the message mode. The order is stopped by the application when no answer results from the couple partner depending on the set time in this field.	0 ... **20** ... 60000
Omb time [100ms]	Only valid for Client orders in the message mode. The connection to the Server is maintained depending on the set time and after expiration of this time it is stopped, if no new order was sent by the application.	0 ... **10** ... 60000
Send timeout [ms]	This is the Send timeout for the TCP connection. It is only used internally. In this field you type in the timeout, how long it is tried to take off the orders via TCP/IP.	**0** ... 1
Connect timeout [ms]	This is the connect timeout for the TCP connection. It is only used internally. Here you give the timeout, how long the TCP Task tries to build up a connection to the Server.	**0** ... 2000000000
Close timeout [ms]	This is the close timeout for the TCP connection built up. This is only used internally. In this field you type in the timeout, how long the TCP Task tries to build up a connection.	**0** ... 2000000000
Swap	Data format, filling of the I/O data in the Dual-port memory. Motorola / Intel Format.	**0** ... 1

Table 14: Device Configuration - OMB_SETUP

4.2.5 ETHERNET Table

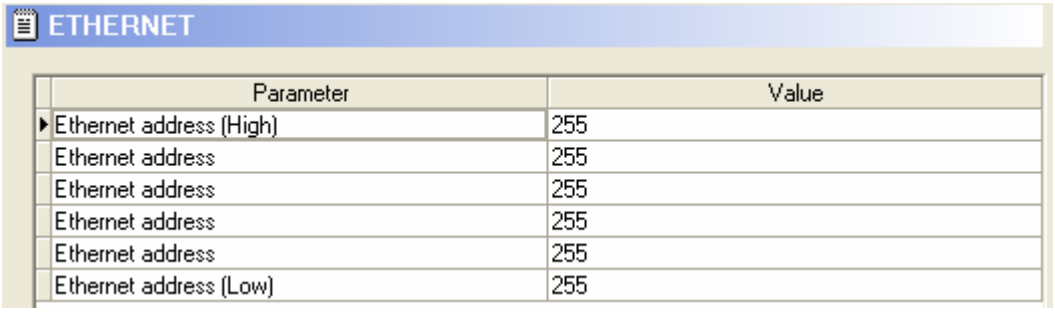


Figure 17: Device Configuration – ETHERNET

Here the MAC address can be entered manually.

The MAC address consists of 48 Bits (6 byte) and is entered in decimal code. The MAC address, with which all 48 Bits are set to one (FF-FF-FF-FF-FF-FF in hex code and/or 255-255-255-255-255-255 in decimal), is used as Broadcast address.

The first byte of the MAC address is entered in the field **Ethernet address (High)** and the last byte in the field **Ethernet address (Low)**.

5 Service

5.1 Overview Service

Descriptions of "Service"

The table below gives an overview for the individual **Service** dialog pages descriptions:

Subsection	Page of the Manual
Device	*32*

Table 15: Dialog Pages Service

Service Dialog Pages

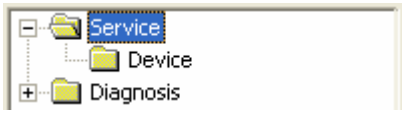


Figure 18: Navigation Area – Service

Note: Accessing the **Service** pages of the Ethernet-ComPro DTM requires an online connection from the Ethernet-ComPro DTM to the device. For further information, refer to section *Connecting / Disconnecting Device* on page 49.

5.2 Device

General Device Information:

The device dialog contains information about the connected hardware. The **Manufacturer Date**, the **Device Number** and the **Serial Number** are retrieved and shown here.

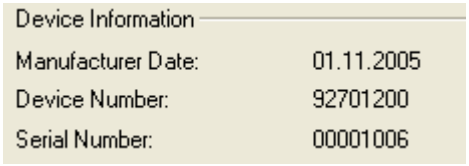


Figure 19: Service - Device Information

6 Diagnosis

6.1 Overview Diagnosis

The dialog **Diagnosis > Device** allows diagnosing the device behavior and communication errors. Thus it contains the function **Firmware-Reset** and **Task States** and the **extended device diagnosis**.

For diagnosis the device must reside in online state. Via a **Firmware-Reset** the device gets reset. Under **Task States** the current task information of the firmware is displayed. The function **Task States** helps to find communication and configuration errors und contains counters, states and parameter information. The **extended device diagnosis** helps to find bus and configuration errors, when default diagnosis fails.

Descriptions of "Diagnosis"

The table below gives an overview for the **Diagnosis** dialog pages descriptions:

Section	Page
Firmware Reset and Task States	*34*
Extended Device Diagnosis	*35*

Table 16: Descriptions of the Diagnosis Pages

Diagnosis Pages

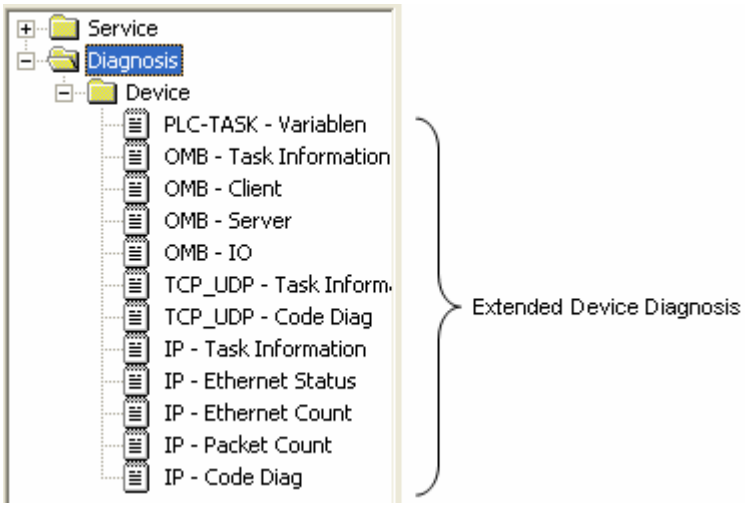


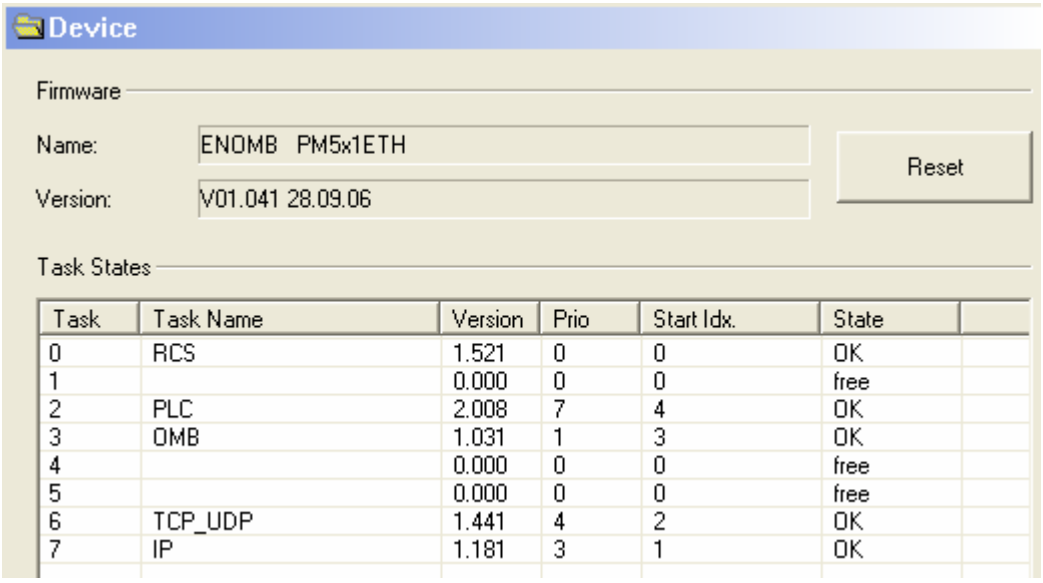
Figure 20: Navigation Area - Diagnosis

Note: Accessing the **Diagnosis** pages of the Ethernet-ComPro DTM requires an online connection from the Ethernet-ComPro DTM to the device (see section *Connecting / Disconnecting Device* on page 49).

6.2 Firmware Reset and Task States

Open **Device** dialog:

➢ Put cursor to **Diagnosis > Device** in the navigation area.



Task	Task Name	Version	Prio	Start Idx.	State
0	RCS	1.521	0	0	OK
1		0.000	0	0	free
2	PLC	2.008	7	4	OK
3	OMB	1.031	1	3	OK
4		0.000	0	0	free
5		0.000	0	0	free
6	TCP_UDP	1.441	4	2	OK
7	IP	1.181	3	1	OK

Figure 21: Diagnosis > Device - Reset Firmware and Task States

Firmware-Reset:

➢ Click to the **Reset** button.

➢ Under **Firmware** the **Name** and the **Version** of the firmware currently loaded in the device are displayed.

Task Information:

The table **Task Information** is listing the task information of the single firmware tasks.

Column	Meaning
Task	Task number
Task Name	Name of the task
Version	Version of the task
Prio	Priority of the task
Start Index	Start index of the task
Status	Status of the task

Table 17: Description Table Task Information

6.2.1 Extended Device Diagnosis

The sub items under **Diagnosis > Device** contain the extended device diagnosis with additionally Task State information. The extended diagnosis contains a list of diagnostic structures. These contain online counters, states and parameters.

Task	Page
PLC-Task - Variables	*35*
OMB - Task Information	*37*
OMB - Client	*38*
OMB - Server	*39*
OMB - IO	*40*
TCP_UDP - Task Information	*41*
TCP_UDP - Code Diag	*42*
IP - Task Information	*43*
IP - Ethernet Status	*44*
IP - Ethernet Count	*45*
IP - Packet Count	*46*
IP - Code Diag	*47*

Table 18: Extended Device Diagnosis

6.2.1.1 PLC-Task - Variables

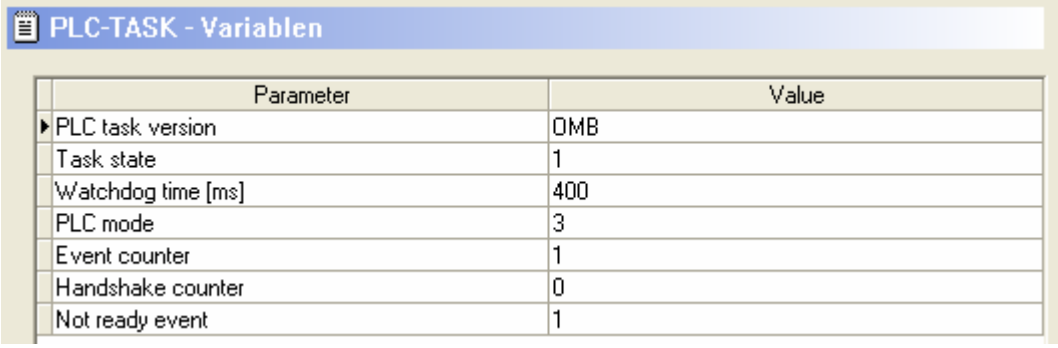


Figure 22: Diagnosis – PLC-TASK – Variables

Parameter	**Meaning**
PLC task version	Version of the PLC task
Task state	State of the Task: 0 = The task is not initialized 1 = The task is initialized and running 2 = The task is actually initializing 3 = Initialization error 4 = Task is initialized and waits for TCP Task
Watchdog time [ms]	Watchdog time in milliseconds
PLC mode	The following PLC modes are supported by the device: 1 = buffered / device controlled 2 = inconsistent / uncontrolled 3 = buffered / host controlled
Event counter	Counter for received events
Handshake counter	Counter for Handshakes
Not ready event	Number detected events start communication to stop communication

Table 19: Diagnosis - PLC-TASK – Variables

6.2.1.2 OMB - Task Information

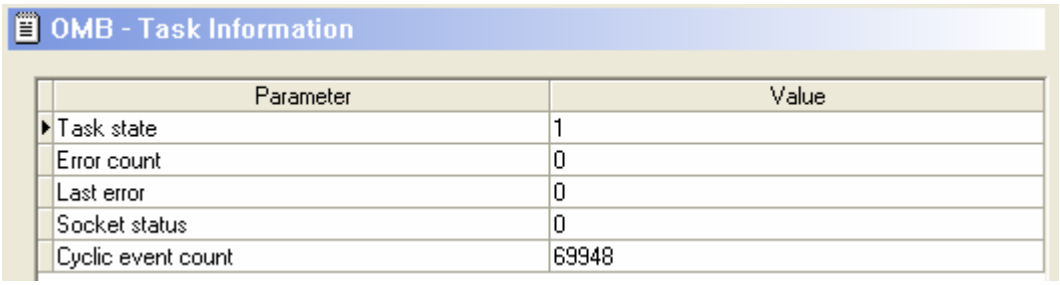


Figure 23: Diagnosis - OMB - Task Information

Parameter	Meaning
Task state	State of the Task: 0 = The task is not initialized 1 = The task is initialized and running 2 = The task is actually initializing 3 = Initialization error 4 = Task is initialized and waits for TCP Task
Error count	Number of occurred errors
Last error	Last occurred error
Socket status	Information about the actual used TCP socket (bit-coded): 1 = Socket 0 (Connection 0 Close/Open, Bit 0) 2 = Socket 1 (Connection 1 Close/Open, Bit 1) 4 = Socket 2 (Connection 2 Close/Open, Bit 2) 8 = Socket 3 (Connection 3 Close/Open, Bit 3) 16 = Socket 4 (Connection 4 Close/Open, Bit 4)
Cyclic event count	Counter for cyclic events

Table 20: Diagnosis - OMB - Task Information

6.2.1.3 OMB - Client

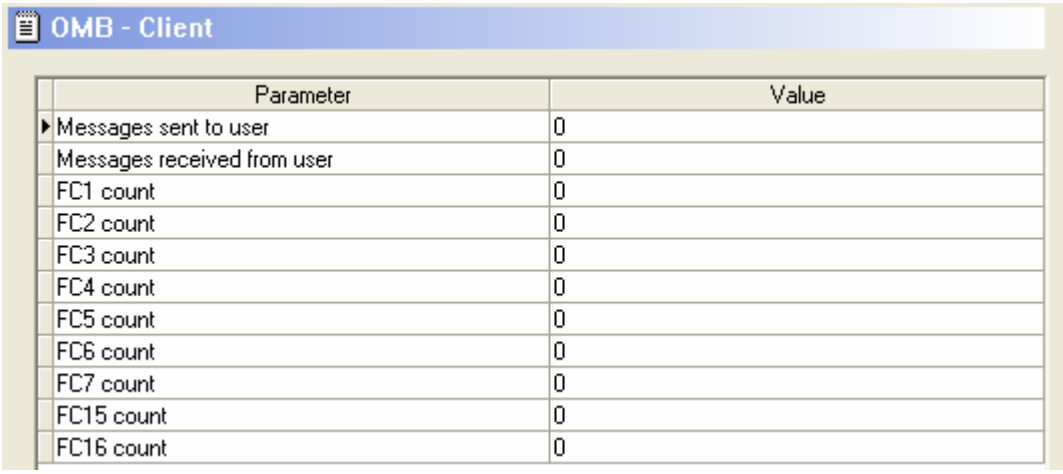


Figure 24: Diagnosis - OMB – Client

Parameter	**Meaning**
Messages sent to user	Number of messages sent to host
Messages received from user	Number of messages received from host
FC1 count	Number of Function Calls for function code 1
FC2 count	Number of Function Calls for function code 2
…	…
FC16 count	Number of Function Calls for function code 16

Table 21: Diagnosis - OMB – Client

6.2.1.4 OMB - Server

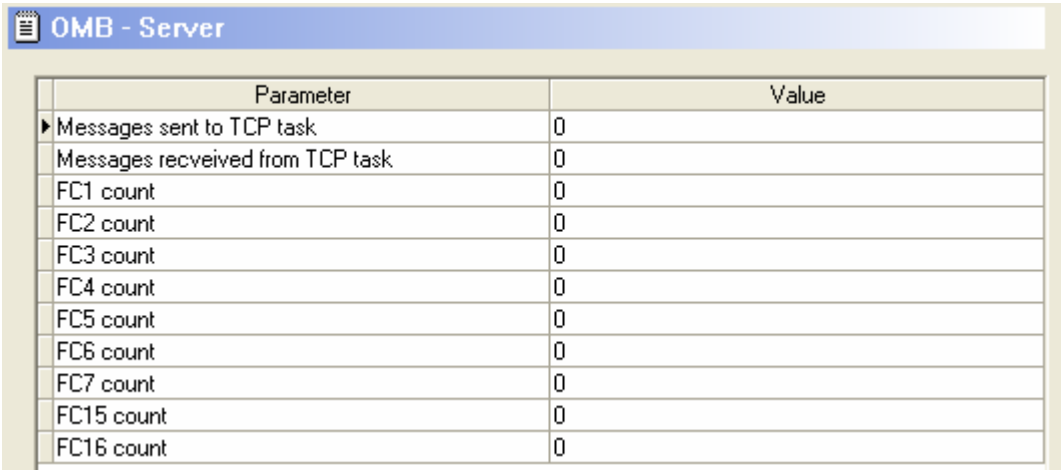


Figure 25: Diagnosis - OMB – Server

Parameter	Meaning
Messages sent to TCP task	Number of messages which were sent to the TCP task
Messages received from TCP task	Number of messages which were received from the TCP task
FC1 count	Number of Function Calls for function code 1
FC2 count	Number of Function Calls for function code 2
…	…
FC16 count	Number of Function Calls for function code 16

Table 22: Diagnosis - OMB – Server

6.2.1.5 OMB - IO

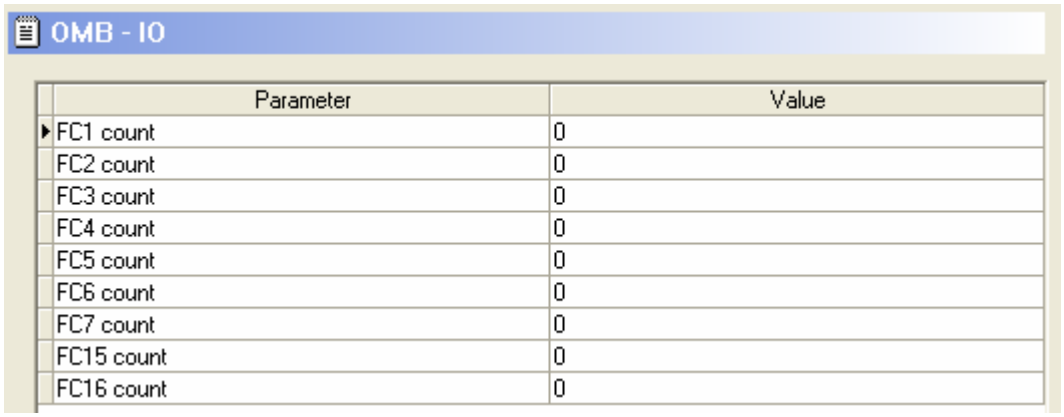


Figure 26: Diagnosis - OMB – IO

Parameter	Meaning
FC1 count	Number of Function Calls for function code 1
FC2 count	Number of Function Calls for function code 2
…	…
FC16 count	Number of Function Calls for function code 16

Table 23: Diagnosis - OMB – IO

6.2.1.6 TCP_UDP - Task Information

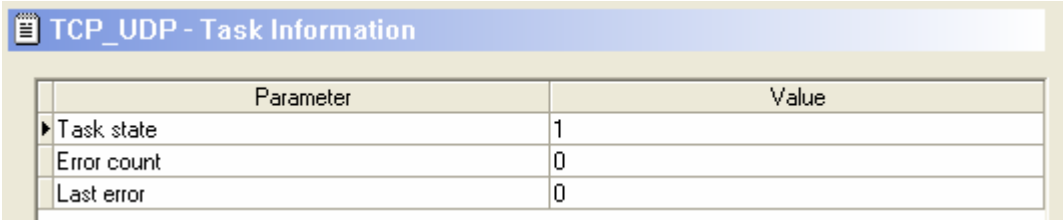


Figure 27: Diagnosis - TCP_UDP - Task Information

Parameter	Meaning
Task state	State of the Task: 0 = Task not initialized 1 = Task is running 2 = Task initialized 3 = reports an error by initialization
Error count	Number of appeared errors
Last error	Last appeared error

Table 24: Diagnosis - TCP_UDP - Task Information

6.2.1.7 TCP_UDP - Code Diag

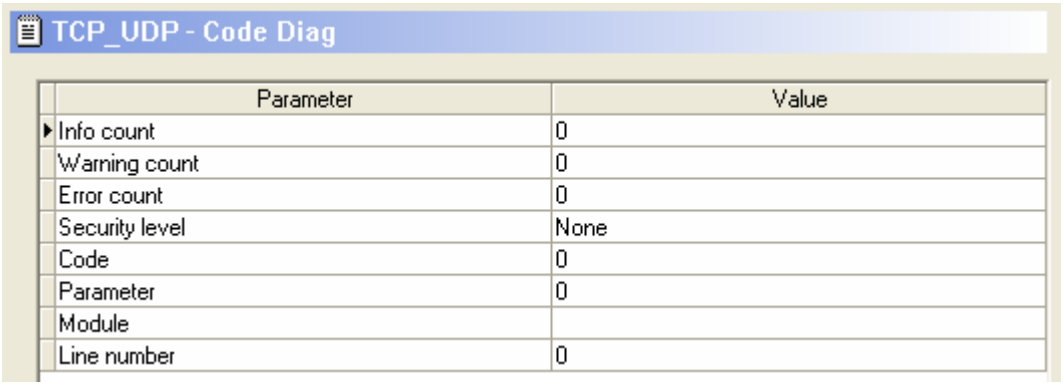


Figure 28: Diagnosis - TCP_UDP - Code Diag

Parameter	Meaning
Info count	Counter for information reports
Warning count	Counter for warning reports
Error count	Counter for errors reports
Security level	Level of the last appeared report
Code	Code of the last appeared report
Parameter	Additional information to the report
Module	Name of the software module which shows the report
Line number	Line number inside the software-module

Table 25: Diagnosis - TCP_UDP - Code Diag

The table TCP_UDP - Code Diag serves only for development purposes. An interpretation by the user is not intended.

6.2.1.8 IP - Task Information

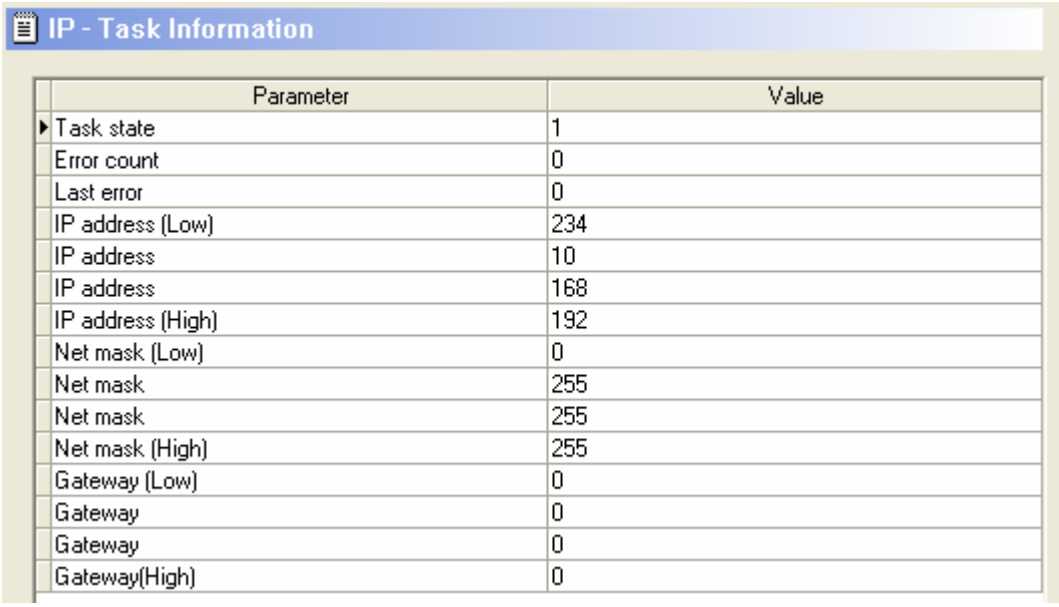


Figure 29: Diagnosis - IP - Task Information

Parameter	Meaning
Task state	State of the Task: 1 = Task is running 2 = initialization is running 3 = initialization has failed
Error count	Counter for appeared errors
Last error	Last appeared error
IP address	In these fields the **IP address** of the device is displayed. An IP address consists of 32 Bits (4 byte) and in each field 1 byte of the address is shown. The first byte of the IP address is shown in the field **IP address (High)** and the last byte in the field **IP address (Low)**.
Net mask	In these fields the **Net mask** is displayed. A net mask consists of 32 Bits (4 byte) and in each field 1 byte of the address is shown. The first byte of the net mask is shown in the field **Net mask (High)** and the last byte in the field **Net mask (Low)**.
Gateway	In these fields the **Gateway** address is displayed. A Gateway address consists of 32 Bits (4 byte) and in each field 1 byte of the address is shown. The first byte of the Gateway address is shown in the field **Gateway (High)** and the last byte in the field **Gateway (Low)**.

Table 26: Diagnosis - IP - Task Information

6.2.1.9 IP - Ethernet Status

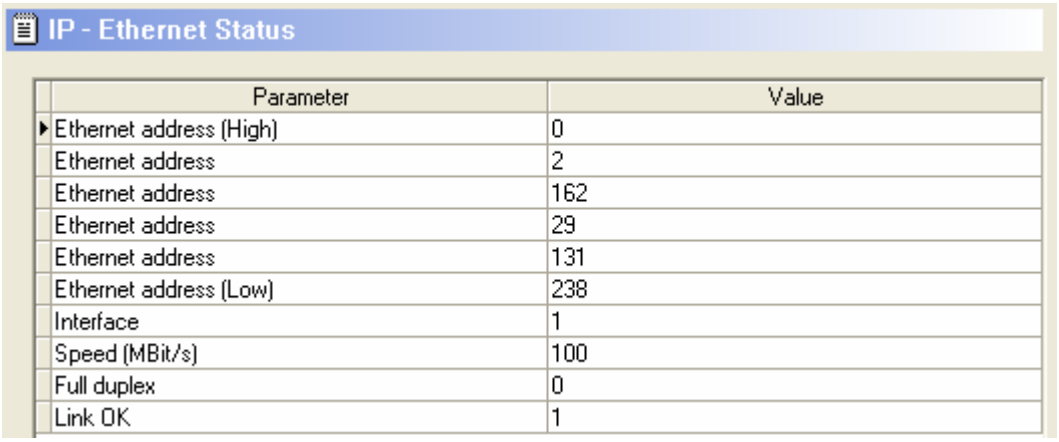


Figure 30: Diagnosis - IP - Ethernet Status

Parameter	**Meaning**
Ethernet address	The first byte of the MAC address is displayed in the field **Ethernet address (High)** and the last byte in the field **Ethernet address (Low)**.
Interface	Actual known Ethernet interface (always 1)
Speed (MBit/s)	Transmission rate: 10/100
Full duplex	Shows the actual Duplex mode: 0 = Half duplex mode 1 = Full duplex mode
Link OK	State of the Twisted Pair connection: 0 = Connection not ok 1 = Connection ok

Table 27: Diagnosis - IP - Ethernet Status

6.2.1.10 IP - Ethernet Count

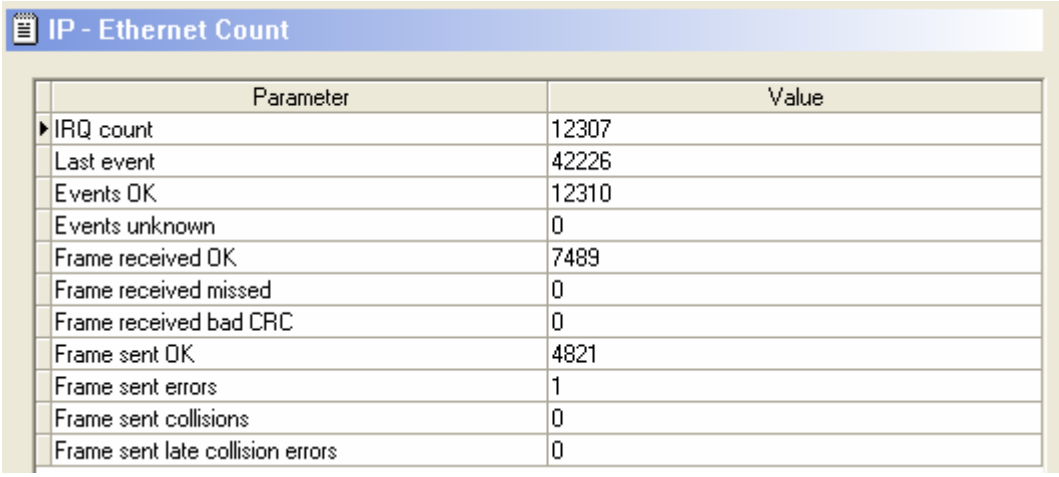


Figure 31: Diagnosis - IP Ethernet Count

Parameter	Meaning
IRQ count	Counter for interrupts of the Ethernet controller
Last event	Last appeared interrupt type
Events OK	Counter for known interrupt types
Events unknown	Counter for unknown interrupt types
Frame received OK	Counter for received Ethernet frames
Frame received missed	Counter for missed Ethernet frames
Frame received bad CRC	Counter for Ethernet frames with CRC errors
Frame sent OK	Counter for sent Ethernet frames
Frame sent errors	Counter for send errors
Frame sent collisions	Counter for sending collisions
Frame sent late collision errors	Counter for late sending collisions

Table 28: Diagnosis - IP - Ethernet Count

6.2.1.11 IP - Packet Count

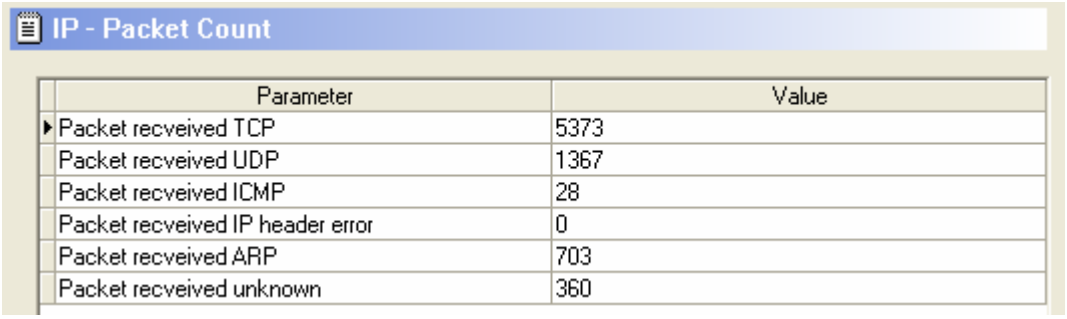


Figure 32: Diagnosis - IP Packet Count

Parameter	**Meaning**
Packet recv TCP	Counter for received TCP packets
Packet recv UDP	Counter for received UDP packets
Packet recv ICMP	Counter for received ICMP packets
Packet recv IP header err	Counter for received IP packets with errors
Packet recv ARP	Counter for received ARP packets
Packet recv unknown	Counter for received packets of an unknown type

Table 29: Diagnosis - IP - Packet Count

6.2.1.12 IP - Code Diag

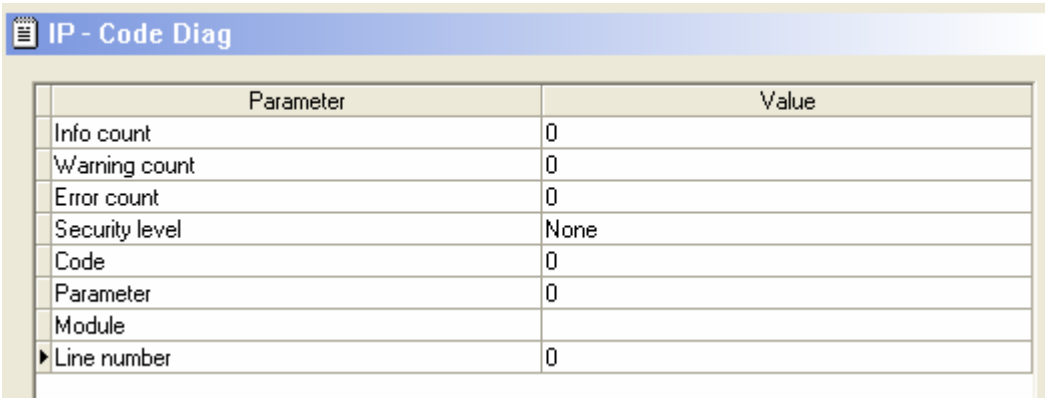


Figure 33: Diagnosis - IP - Code Diag

Parameter	Meaning
Info count	Counter for information reports
Warning count	Counter for warning reports
Error count	Counter for errors reports
Security level	Level of the last appeared report
Code	Code of the last appeared report
Parameter	Additional information to the report
Module	Name of the software module which shows the report
Line number	Line number inside the software-module

Table 30: Diagnosis - IP - Code Diag

The table IP - Code Diag serves only for development purposes. An interpretation by the user is not intended.

7 Online to the Device

7.1 Connecting / Disconnecting Device

For using the functions **Service** and **Diagnosis**, it is necessary that an online connection to the device exists otherwise this dialogs are not available or do not contain values.

Note: Configuration settings on the dialog pages **Settings** or **Configuration** can only be edited if the device is offline.

Connecting Device

The following steps are needed to establish a connection:

1. Select one or several driver/s (see section *Driver* on page 19).
2. Assign the device (see section *Device Assignment* on page 22).
3. Close the DTM interface dialog by clicking the **OK** button.
4. Put a right-click on the device symbol.
5. Select the **Connect** command from the right mouse button menu.

➪ Now the device is online.

Disconnecting Device

To close the connection from the Ethernet-ComPro DTM to a device take the following steps:

1. Close the DTM interface dialog by clicking the **OK** button.
2. Right-click on the device symbol.
3. Select the **Disconnect** command from the context menu.

➪ Now the device is disconnected from the DTM.

7.2 Download Configuration

Note: To download configuration parameter data to the device an online connection from the Ethernet-ComPro DTM to the device is required. Further information can be found in the *Connecting / Disconnecting Device* section on page 49.

To transfer the configuration with the corresponding parameter data to the device you must download the data to it using the SYCON.net **netFrame** application.

8 Error Numbers

8.1 Definition Error Numbers

For COM based application, like the ODM Server and ODM drivers, a common error definition is used, similar to the Microsoft Windows HRESULT definition.

Error code definition:
COM Errors are HRESULTs, which are 32 bit values using the following layout:

```
 3 3 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1
 1 0 9 8 7 6 5 4 3 2 1 0 9 8 7 6 5 4 3 2 1 0 9 8 7 6 5 4 3 2 1 0
+---+-+-+-----------------------+-------------------------------+
|Sev|C|R|     Facility          |               Code            |
+---+-+-+-----------------------+-------------------------------+
```

where

Sev - *is the severity code:*

- *00* - *Success*
- *01* - *Informational*
- *10* - *Warning*
- *11* - *Error*

C - *is the Customer code flag*

R - *is a reserved bit*

Facility - *is the facility code*

Code - *is the facility's status code*

In this common error definition, several error code regions are already reserved by Windows itself, the ODM and some other modules.

8.1.1 Overview Error Numbers

Module	Error Code Region
General Hardware Error Codes / RCS Operating System	*RCS Error Numbers*: 4 .. 39
ODM Server *Online Data Manager Error Numbers*	*Online Data Manager Error Numbers*: 1000 .. 1018
	Message Handler Error Numbers: 2010 .. 2027
	Driver Functions Error Numbers: 2501 .. 2512
	Online Data Manager Subfunctions Error Numbers: 8001 .. 8035
Fehlernummern 3S Gateway Driver	*3S Gateway Driver Error Numbers*: 401 .. 407
Error Codes Data Base	*Data Base Access Error Numbers*: 100 .. 130
	Data Base Functions Error Numbers: 4000 .. 4199
Converting Functions Error Numbers	*Converting Functions Error Numbers*: 5000 .. 5012

Table 31: Error Code Regions

Note: The fieldbus specific error codes depend from the firmware used in the device. They are described in the manuals of the corresponding protocol tasks.

8.2 General Hardware Error Codes

8.3 RCS Error Numbers

This is the list of error numbers returned by the RCS (Realtime Communication System), that is the operating system of devices. The error number is returned in an answer message. Command messages and answer messages are used to communicate between the application and the device. An example of this communication is the download of a configuration.

Error Number	Description
4	Task does not exist
5	Task is not initialized
6	The MCL is locked
7	The MCL rejects a send command because of an error
20	The user will download a database into the device that is not valid for this device type.
21	Data base segment not configured or not existed
22	Number for message wrong during download
23	Received number of data during download does not match to that in the command message
24	Sequence identifier wrong during download
25	Checksum after download and checksum in command message do not match
26	Write/Read access of data base segment
27	Download/Upload or erase of configured data base type is not allowed
28	The state of the data base segment indicated an error. Upload not possible
29	The access to the data base segment needs the bootstraploader. The bootstraploader is not present
30	Trace buffer overflow
31	Entry into trace buffer too long
37	No or wrong license. The OEM license of the System Configurator allows only communication to devices that have the same license inside
38	The data base created by the System Configurator and the data base expected by the firmware is not compatible
39	DBM module missing

Table 32: RCS error numbers (answer message) (4 .. 39)

Error Number	Description
40	No command free
41	Command unknown
42	Command mode unknown
43	Wrong parameter in the command
44	Message length does not match to the parameters of the command
45	Only a MCL does use this command to the RCS
50	FLASH occupied at the moment
51	Error deleting the FLASH
52	Error writing the FLASH
53	FLASH not configured
54	FLASH timeout error
55	Access protection error while deleting the FLASH
56	FLASH size does not match or not enough FLASH memory
60	Wrong structure type
61	Wrong length of structure
62	Structure does not exist
70	No clock on the device
80	Wrong handle for the table (table does not exist)
81	Data length does not match the structure of this table
82	The data set of this number does not exist
83	This table name does not exist
84	Table full. No more entries allowed
85	Other error from DBM
90	The device info (serial number, device number and date) does already exist
91	License code invalid
92	License code does already exist
93	All memory locations for license codes already in use

Table 33: RCS error numbers (answer message) (40 .. 93)

8.4 Online Data Manager Error Numbers

8.4.1 Online Data Manager Error Numbers

The following table lists the error numbers of the Online Data Manager.

Error Number	Description
1000	Driver OnlineDataManager not opened
1001	Initialization of the OnlineDataManager has failed
1002	No DriverObject found. OnlineDataManager Sub DLL not found.
1003	No DeviceObject found. Device not found.
1004	Application not found
1010	Application has requested an unknown event
1011	Application has requested an unknown function mode, operating mode. Known function modes, operating modes are Reset, Download, Register Server, Unregister Server.
1012	Application has requested an unknown command
1013	Message Server already exists
1014	Message Server not registered
1015	Device already in use
1016	Device not assigned
1017	Device has changed
1018	Command active

Table 34: Online Data Manager Error numbers (1000 .. 1018)

8.4.2 Message Handler Error Numbers

The following table lists the error numbers of the Message handler of the Online Data Manager.

Error Number	Description
2010	Message handler: Messagebuffer empty
2011	Message handler: Messagebuffer full
2021	Message handler: Invalid Message ID (msg.nr)
2022	Message handler: No entry
2023	Message handler: Message already active
2024	Message handler: Wrong Application
2025	Message handler: Message Timeout No message received. **Possible Error Cause:** Different reasons. **(1)** The selected interrupt is not free or used also from another PC component (shared interrupt). **(2)** CIF or device or device is not initialized. This is shown by an acyclic flashing RUN LED. **(3)** CIF or device is in bootstraploader mode. This is indicated by a flashing RDY LED. **(4)** Another application program is accessing to the CIF or device the same time as SYCONnet. **Remedy:** **(1A)** Use polling mode instead of interrupt mode. Shared interrupts are not supported from the CIF device driver under Windows® 95/ Windows® 98/ Windows® ME/ Windows® NT. **(1B)** Use a free interrupt. **(2)** Download the configuration. If necessary create a new configuration. **(3)** First download the firmware and then download the configuration. **(4)** Close all other application programs that communicates to the CIF or device.
2026	Message handler: Wait for Delete
2027	Message handler: No cyclic Message

Table 35: Error Numbers of the Message Handler of the Online Data Manager (2010 .. 2027)

8.4.3 Driver Functions Error Numbers

The following table lists the error numbers of the Driver Functions of the Online Data Manager.

Error Number	Description
2501	Online Data Manager Sub DLL not found
2502	Function missing
2503	'Read Thread' not created
2504	'Write Thread' not created
2505	'IO Thread' not created
2510	Function failed
2512	Assign reports error. Return neither OK or cancel

Table 36: Error Numbers of the Driver Functions of the Online Data Manager (2501 .. 2512)

8.4.4 Online Data Manager Subfunctions Error Numbers

The following table lists the error numbers of the Subfunctions of the Online Data Manager.

Error Number	Description
8001	Driver not opened. E.g. CIF Device Driver
8002	Application has requested an unknown event
8003	Application has requested an unknown command
8004	Command has failed
8005	Command active
8006	Device invalid
8010	No device was assigned
8011	Device was already assigned
8020	Driver not connected
8021	Driver already connected
8030	Faulty 'GetState'
8031	Send error (PutMessage returns error)
8032	Send active (PutMessage active)
8033	Receive error (GetMessage returns error)
8034	Receive active (GetMessage active)
8035	IO Error (Exchange IO returns error)

Table 37: Subfunction Error Numbers of the Driver Functions of the Online Data Manager (8001 .. 8035)

8.5 3S Gateway Driver Error Numbers

Error Number	Description
401	Driver error in the control
402	slot number is not supported by the hardware
403	no coupler at the given slot
404	control not in STOP
405	configuration data invalid
406	coupler still configured by Ethernet ComPro DTM-internal Configurator
407	answer timeout of the coupler

Table 38: 3S Gateway Driver Error Numbers

8.6 Data Base Access Error Numbers

The following table lists the error numbers of the database access errors

Error Number	Description
100	Database already opened
101	Dataset could not be opened
103	Error while opening database occurred
104	No valid path name
105	No connection to data base. Call function DbOpen().
106	Error in parameter
107	Error during opening a table
108	Nullpointer occurred
109	Table not opened. Call function OpenTable() first.
110	The first record is reached
111	The last record is reached
112	Unknown type in the record found
113	Data has to be truncated
114	No access driver installed on the system
115	Exception received
116	This table is set to read only
117	There is no data set in the table
118	The requested table could not be edit
119	An operation could not be completed
120	User gives an unexpected length in WriteDs().
121	An assertion failed
122	DLL not found
123	DLL couldn't be freed
124	Specified function not found in the DLL
125	ODBC Function returns an error
126	Count of data bytes in the record exceeds 1938
127	DBM32 DLL is not loaded
128	Field with the given index was not found
129	This table contains no records
130	Invalid character (' ') found in a Table or Column

Table 39: Database Access Error Numbers (100 .. 130)

8.7 Data Base Functions Error Numbers

The following table lists the error numbers of the converting functions.

Error Number	Description
4000	File does not exist
4001	Success in compromising
4002	Dataset does not exist
4003	Last respectively first entry reached
4004	Not enough memory
4005	File directory full
4006	Max number of entries reached
4007	No writing to this table possible, because the table is located in the FLASH
4008	Table name does already exist
4009	File name does not exist
4010	Free RAM length from RCS_CNF.P86 is smaller than E_F_INDEX * 2
4011	Parameter ‘next’ wrong
4012	Not enough free space to copy data set
4013	Set is deleted
4014	Value for Index is wrong
4015	Access not allowed
4016	open_file used before init_file
4017	Drive is not ready
4018	Not enough drive memory
4019	File name or path does not exist
4020	Cannot create path
4021	Wrong path
4022	Wrong flag
4023	The delete path is the root path
4024	Path file exists
4025	Write error during write a file
4026	Error during create a file
4027	Error during close a file
4028	No DBM file
4029	Length of the read data is unequal of the file length

Table 40: Error numbers of converting functions (4000 .. 4029)

Error Number	Description
4030	Path too long
4031	Directory changed
4032	Directory created
4034	Length of converting stream is 0
4035	Non equal data set found
4036	Non equal data set found
4037	Non equal data set found
4038	Data set has length 0
4039	The function DbmInit has assigned a Zero pointer during RCS initialization
4040	Printer not ready
4041	The data base is used from another function
4042	New length of data base is smaller than used
4043	Unknown access mode
4044	Old data base has to be converted
4045	Error while converting. Function not known
4046	Unknown type in set 0 found
4047	No float function available
4048	Function not in RCS module
4049	Check failed
4050	Checksum check failed
4051	More segments are existing in file, than in the structure FILE_INFO_T in wMaxEntries
4052	SegLen in structure FILE_INFO_T is smaller then the length in the file. Return of function dbm_restore_data
4053	The header file holds an other information for a length than in the segment itself
4054	Not enough memory for allocation on the PC
4055	No index for file handle in structure FLASH_DIR of RCS found
4057	File type 2 can not be printed because of too many definitions
4058	The definitions need too many lines to display them, than in the program available
4059	An unknown format for the parameter. Valid is U, H, or S
4060	Unknown parameter type

Table 41: Error numbers of converting functions (4030 .. 4060)

Error Number	Description
4061	The data base was transmitted into the FLASH
4062	Set 0 contains no structure definition
4063	Set 0 can not be deleted
4064	Error during execution of a ODBC data base access
4065	Initialization of DBM through RCS had no success
4066	Passed data length incorrect
4067	Sorting function not linked
4068	Error in function parameter
4069	Error from ODBC table
4070	No free handle available. Too many data base links are already opened
4071	Unknown data type found in the table
4072	Structure of table GLOBAL not correct or no such table existing
4073	No name of an ACCESS data base
4074	Download window can’t be created
4075	Download not fully performable

Table 42: Error numbers of converting functions (4061 .. 4075)

Error Number	Description
4082	More than 32 tables should be created
4083	No entry in element szSourceFile
4084	ODBC connection initialization not possible. This could happen when in file ODBCINST.INI in section [Microsoft Access Driver (*.mdb)] is no valid path to ODBCJT16/32.DLL.
4085	Error in structure in the ACCESS data base that is in DBM format
4086	Error in structure in the ACCESS data base that is in DBM format
4087	No data in a ODBC table
4088	No entry
4089	ODBC set length not valid
4090	Not enough data sets in ODBC table
4091	Table Create Tab not found
4092	Error in structure of table CreateTab
4093	No entry in element szSourceTable
4094	No entry in element szDestTable
4095	Entry in iSourceType of table CreateTab is wrong
4096	Entry in iTranslate of table CreateTab is wrong
4097	Function SQLAllocStmt reports an error
4098	ODBC source table not found
4099	ODBC data truncated
4100	Download timeout
4101	Library load error
4102	Library function error
4103	Error in description 'toggle'
4104	Error in description 'KB'
4105	Column does not exist
4106	ODBC structure different
4107	ODBC address error
4108	No CRC sum exists (table GLOBAL exists or old)
4109	Table GLOBAL is old
4110	Calculated CRC different to CRC in table GLOBAL
4199	Programming error

Table 43: Error numbers of converting functions (4082 .. 4199)

8.8 Converting Functions Error Numbers

The following table lists the error numbers of converting functions.

Error Number	Description
5000	Function PackLongToByteShort: Not enough space in pvD (Number of elements greater than reserved memory)
5001	Function PackLongToByteShort: Not enough space in pvD. Detected during converting of pvS
5002	Function PackLongToByteShort: Not enough space in pvD
5003	Function StringToByte: Not enough space in pvD
5004	Function IntToByte: Not enough space in pvD
5005	Function LongToShort: Not enough space in pvD
5006	Function PackStringDumpToByteArray: Not enough space in pvD
5007	Function PackStringBumpToByteArray: A character was found, which is not convertible into a HEX value
5008	Function PackStringDumpToByteArray: Number of character odd
5009	Function PackStringDumpToByteArray: Not enough space in pvD
5010	Function PackStringDumpToByteArray: The current data set needs to be appended the previous one
5011	Function PackStringDumpToByteArray: No corresponding function to the given number exist
5012	Converting error

Table 44: Error Numbers of data base functions (5000 .. 5012)

9 Annex

9.1 Referenzes

[1] Device Type Manager (DTM) Style Guide, Version 1.0 ; FDT-JIG - Order No. <0001-0008-000>

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11 Glossary

DHCP

Dynamic Host Configuration Protocol

DTM

Device Type Manager

The Device Type Manager (DTM) is a software module with graphical user interface for the configuration and/or for diagnosis of devices.

FDT

Field Device Tool

FDT specifies an interface, in order to be able to use DTM (Device Type Manager) in different applications of different manufacturers.

TCP/IP

Transmission Control Protocol / Internet Protocol

UDP

User Datagram Protocol

Operating Instruction Manual

Ethernet Device Configuration

Setting IP Address for Ethernet compatible Hilscher Devices using the NetIdent/DCP Protocol

Edition: 2
Language: English (EN)

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Web: www.hilscher.com

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1 Introduction

1.1 About Ethernet Device Configuration

This manual describes the program **Ethernet Device Configuration**. The program **Ethernet Device Configuration** is used to set the IP address for Ethernet compatible Hilscher devices.

1.2 System Requirements

- PC
- Windows® 2000, Windows® XP
- Windows® 2000: Service Pack 2 or higher
- Free hard disk memory: 2 MByte
- CD ROM drive
- Graphic resolution:
  640 x 480; recommended min. 800 x 600 pixel
- Keyboard and mouse
- The used Ethernet device must support the Hilscher NetIdent or DCP protocol and it must be connected to the network.

1.3 Legal Notes

1.3.1 Guarantee

Although this program has been developed with great care and intensively tested, Hilscher Gesellschaft für Systemautomation mbH cannot guarantee the suitability of this program for any purpose not confirmed by us in writing.

Guarantee claims shall be limited to the right to require rectification. Liability for any damages which may have arisen from the use of this program or its documentation shall be limited to cases of intent.

We reserve the right to modify our products and their specifications at any time in as far as this contribute to technical progress. The version of the manual supplied with the program applies.

1.3.2 Valid Sign Right and Registered Trademarks

All brands and trademarks mentioned in this manual and respectively protected by third parties are unlimited subjected to the regulations of the respectively valid sign and the possession rights of the respective registered owners.

Windows® 2000/Windows® XP are registered trademarks of Microsoft Corporation.

1.4 Support

If you have any question please contact our subsidiaries, your local distributor or our technical support:

Phone: +49 (0) 6190 9907-99

E-Mail: hotline@hilscher.com

1.5 Controls

General Buttons

Button	Meaning
OK	To confirm your latest settings, click on the **OK** button. All changed values will be applied on the program application database. *The dialog then closes.*
Cancel	To cancel your latest changes, click on the **Cancel** button. Answer to the safety query that the changes are not to be stored. Then the changed values will not be applied on the program application database. *The dialog then closes.*

Table 1: General Buttons

1.6 Conventions in this Manual

Operation Instructions:

Operation instructions are marked as follows:

➢ text text text

or

1. text text text
2. text text text

Results:

A result of an operation step is marked as follows:

⇨ text text text text

Important Hints:

Note: text text text

Important notes are indicated with the signal word “Note” and by a symbol.

2 Presets

2.1 Selecting Language

You can display the user interface in German or in English.

➢ Select the language via **Options > Language**.

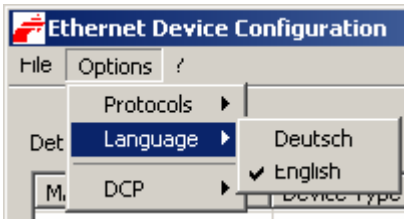

Figure 1: Options > Language

2.2 Activating Protocols

Select the used protocols for scanning or configuring Ethernet based devices.

➢ Activate the protocols via **Options > Protocols > [*protocol name*]**.

↬ The check beside the protocol shows, if the respective protocol is activated.

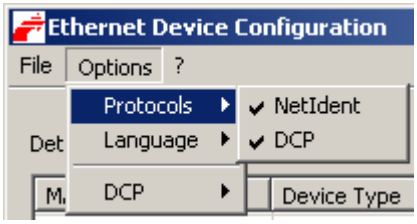

Figure 2: Options > Protocols

Note: By default the NetIdent protocol and the DCP protocol are activated. Also only one protocol can be activated. In this case only devices supporting the activated protocol are found during the scanning process.

For information concerning the scanning process refer to section *Searching Devices* on page 11.

3 Searching Devices

3.1 Scanning the Network for Devices

➢ Click the button **Search Devices**.

➢ The local Ethernet Network is scanned for DCP/NetIdent compatible devices.

➢ Devices found during the network scan are listed in the table **Detected Devices**.

Note: If the IP address of a device is 0.0.0.0, assignment of an IP address is required to allow TCP/IP communication with the device.

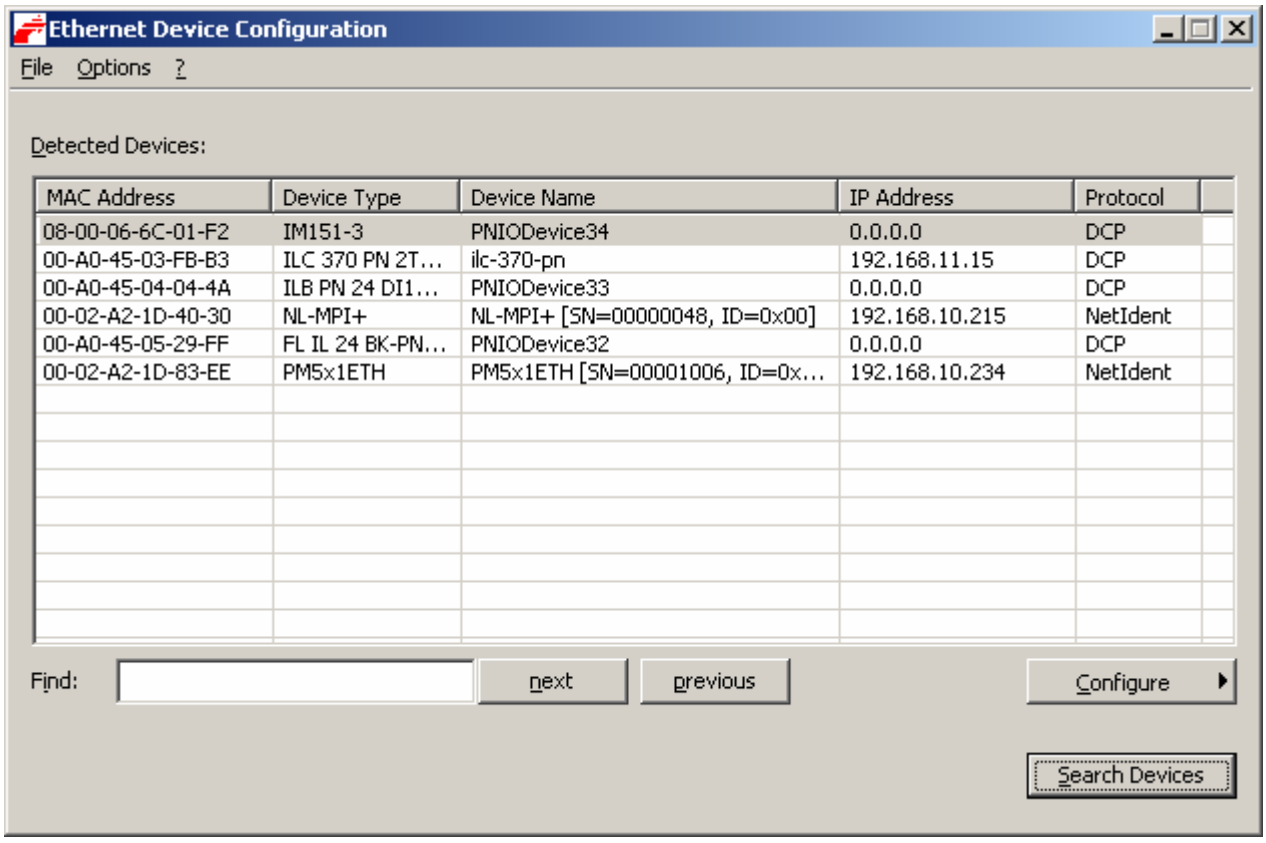

Figure 3 : Dialog Ethernet Device Configuration

Parameter	Meaning
MAC Address	Unique Ethernet device address.
Device Type	Device type
Device Name	Device name and further information, e. g. serial number
IP Address	IP address of the device. The IP address must be unique and compatible to the used network. The IP address 0.0.0.0 shows, that no IP address was set yet.
Protocol	Protocol which has detected the device
Find / next / previous	Here you can search in the table **Detected Devices** for a certain device.

Table 1: Parameter Table Detected Devices

4 NetIdent

4.1 Setting IP Address using NetIdent Protocol

Note: The **NetIdent** protocol is only supported by Hilscher devices.

To reassign or to change the IP address of a device using the NetIdent protocol:

1. Select the device you want to configure from the **Detected Devices**.
2. Open the IP Configuration dialog.

➢ Therefore click the button **Configure > Set IP Address**.

Figure 4: Button Configure > Set IP Address

Or

➢ Open the context menu via right click and select **Set IP Address**.

Figure 5: Context Menu (Right Click) - Set IP Address

➢ The dialog **IP Configuration for [***MAC Address***]** opens.

4.2 Setting IP Configuration

Note: Depending on the device the transfer of the IP address can take up to 40 seconds. During this time the dialog remains open. Canceling an active transmission via **Cancel** does not guarantee the new IP address setting is being discarded by the device.

Note: The IP address is only temporarily adjusted. To save the IP address permanently a configuration must be downloaded. For further information to the configuration download refer to the **netDevice** user manual.

➢ Type in the IP address for the device to the dialog **IP Configuration for [***MAC Address***]**.

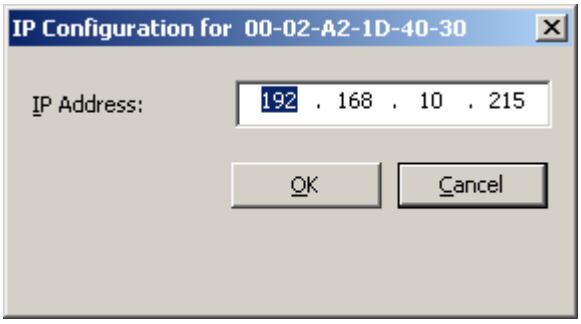

Figure 6: Dialog IP Configuration for [MAC Address]

➢ Click the button **OK**.

➢ The new IP address is transferred to the device.

5 DCP

5.1 Configuring DCP Options

To activate network devices for the DCP protocol:

➢ Click to **Options > DCP > Configure**.

Figure 7: Options > DCP > Configure

➧ The dialog **DCP Configuration** is displayed.

Note: By default all network devices are preselected.

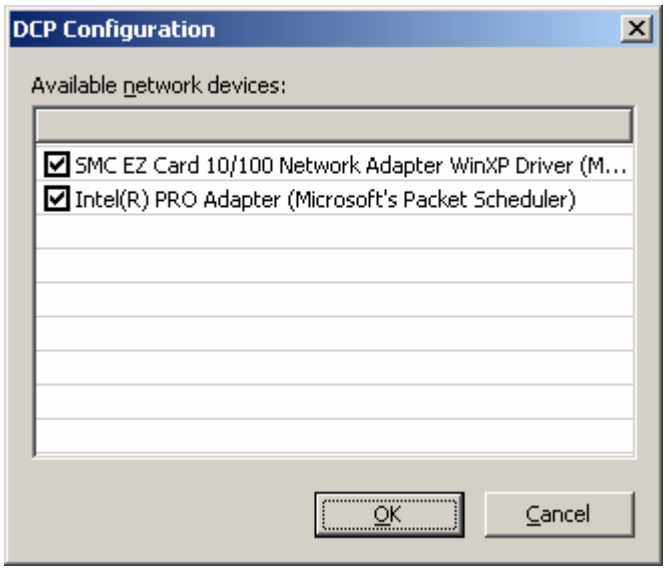

Figure 8: Dialog DCP Configuration

➢ Select the network devices which are scanned for DCP compatible devices.

➢ Click the button **OK**.

5.2 Setting IP Address using DCP Protocol

Note: The DCP protocol is supported by PROFINET compatible devices.

To reassign or to change the IP address of a device using the DCP protocol:

1. Select the device you want to configure from the **Detected Devices**.
2. Open the **IP Configuration** dialog.

➢ Therefore click the button **Configure > Set IP Address**.

Figure 9: Button Configure > Set IP Address

Or

➢ Open the context menu via right click and select **Set IP Address**.

Figure 10: Context Menu (Right Click) - Set IP Address

➢ The dialog **IP Configuration for [*MAC Address*]** opens.

5.2.1 IP Configuration for [*MAC Address*]

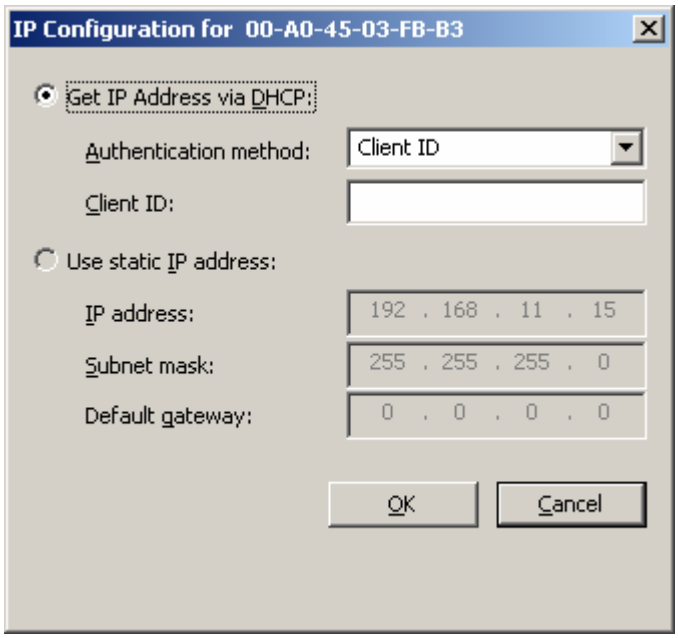

Figure 11: Dialog IP Configuration for [MAC Address]

Parameter	Meaning	Value / Value Range
Get IP Address via DHCP		
Authentication method	As authentication method **Client ID**, **MAC Address** or **Station name** can be selected.	Client ID, MAC Address, Station name
Client ID	ID number of the respective selected client	
Use static IP address		
IP address	IP address of the respective selected client	
Subnet mask	Network mask of the respective selected client	
Default gateway	IP address of the gateway	

Table 2: Parameter IP Configuration for [MAC Address]

5.2.2 Notes on IP Configuration

Note: Depending on the device the transfer of the IP address can take some time. During this time the dialog remains open. Canceling an active transmission via **Cancel** does not guarantee the new IP address setting is being discarded by the device.

Note: The IP address is only temporarily adjusted. To save the IP address permanently the configuration must be downloaded.

Note: If necessary, go to your system administrator to solve if the presetting **Get IP Address via DHCP** is suitable to your network configuration and which authentication method you need to select.

5.2.3 Get IP Address via DHCP

Select **Get IP Address via DHCP**.

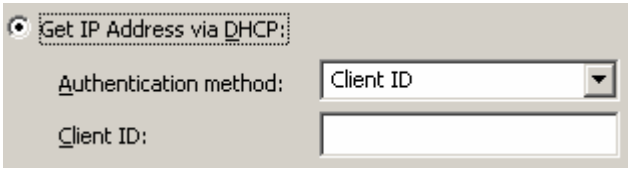

Figure 12: Dialog IP Configuration for [MAC Address] - Get IP Address via DHCP

- Select an **Authentication method**.
- If you selected **Client ID**, type in the client ID number in the **Client ID** field.
- Click the button **OK**.

The new configuration is transferred to the device.

5.2.4 Use static IP address

- Select **Use static IP address**.

Figure 13: Dialog IP Configuration for [MAC Address] - Use static IP address

- Type in the IP address of the selected device in the **IP Address** field.
- Type in the network mask of the selected device in the **Subnet mask** field.
- Type in the IP address of the gateway in the **Default gateway** field.
- Click the button **OK**
- The new configuration is transferred to the device.

5.3 Set Device name

Note: The station name must comply with the PROFINET specification. Forbidden signs (e. g. blanks) must not be used in the name.

To set the **Device Name** of a device using the DCP protocol or to the change the name:

1. Select the respective device from the **Detected Devices**.
2. Open the **Name Configuration** dialog.

➢ Therefore click the button **Configure > Set Device Name**.

Figure 14: Button Configure > Set Device Name

Or

➢ Open the context menu via right click and select **Set Device Name**.

Figure 15: Context Menu (Right Click) - Set Device Name

➢ The dialog **Name Configuration for [*MAC Address*]** opens.

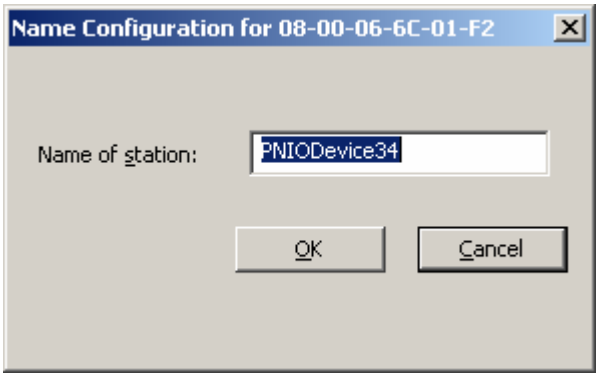

Figure 16: Dialog Name Configuration for [MAC Address]

➢ Type in the name of station.

➢ Click the button **OK**.

➢ The new name of station is transferred to the device.

6 Close the Program

6.1 Quit

➢ To close the **Ethernet Device Configuration** program, select **File > Quit**.

Figure 17: Dialog Ethernet Device Configuration - File > Quit

7 Annex

7.1 Contacts

7.1.1 Hilscher Europe

Contact	Germany	France
Address	Hilscher Gesellschaft für Systemautomation mbH Rheinstraße 15 D-65795 Hattersheim	Hilscher France s.a.r.l. 12 rue du 35ième Régiment d'Aviation Miniparc du Chêne FR-69500 Bron
Phone	+49 (0) 6190 9907-0	+33 (0) 472379840
Phone Sales	+49 (0) 6190 9907-90	+33 (0) 472379840
Phone Support	+49 (0) 6190 9907-99	+33 (0) 472379840
Fax	+49 (0) 6190 9907-50	+33 (0) 478268327
E-Mail	info@hilscher.com	info@hilscher.fr
E-Mail Sales	sales@hilscher.com	
E-Mail Support	hotline@hilscher.com	
Web	www.hilscher.com	www.hilscher.com

Contact	Italy	Switzerland
Address	Hilscher Italia s.r.l. Via Grandi, 25 IT-20090 Vimodrone (MI)	Hilscher Swiss GmbH Hubelmattstraße 29 CH-4500 Solothurn
Phone	+39 / 0225007068	+41 (0) 32 6236 633
Phone Sales	+39 / 0225007068	+41 (0) 32 6236 633
Phone Support	+39 / 0225007068	+49 (0) 6190 9907-99
Fax	+39 / 0225029973	+41 (0) 32 6236 632
E-Mail	info@hilscher.it	info@hilscher.ch
E-Mail Sales	sales@hilscher.it	sales@hilscher.com
E-Mail Support	supporto@hilscher.it	hotline@hilscher.com
Web	www.hilscher.com	www.hilscher.com

7.1.2 Hilscher North America

Contact	North America
Address	Hilscher North America, Inc. 2443 Warrenville Road, Suite 100 Lisle, Illinois 60532, USA
Phone	(+1) 630 505 5301
Phone Sales	(+1) 630 505 5301
Phone Support	(+1) 630 505 5301
Fax	(+1) 630 505 7532
E-Mail	info@hilscher.us
E-Mail Sales	info@hilscher.us
E-Mail Support	info@hilscher.us
Web	www.hilscher.com

7.1.3 Hilscher Japan

Contact	Japan
Address	Hilscher Japan K.K. YKB Shinjuku-Gyoen Bldg. 3F 1-3-8 Shinjuku, Shinjuku-ku Tokyo, 160-0022
Phone	+81 (0) 3-5362-0521
Phone Sales	+81 (0) 3-5362-0521
Phone Support	+81 (0) 3-5362-0521
Fax	+81 (0) 3-5362-0522
E-Mail	info@hilscher.jp
E-Mail Sales	info@hilscher.jp
E-Mail Support	info@hilscher.jp
Web	www.hilscher.com

7.1.4 Worldwide: Distributors

Please visit our Homepage at
www.hilscher.com

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9 Glossary

DCP

The **Discovery Control Protocol** is a communication protocol for PROFINET IO. Using this protocol a PROFINET IO-Controller or supervisor can find a PROFINET IO-Device in a subnet. The IP address of the PROFINET IO-Controller is to be set previously.

IP Address

An IP address serves for the unique addressing of a device in a network. The IP address (IPV4) consists of four numbers from 0 to 255 e.g. 192.168.10.160.

MAC Address

Acronym for "Media Access Control" - A 48 bit Ethernet device identification number (as a rule unique and unalterable) represented by hexadecimal numbers. Data frames in the Ethernet network are always delivered via the MAC address.

Operating Instruction Manual

DTM for ABB CANopen Master Devices

Configure ABB Master Devices

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ABB STOTZ-KONTAKT GmbH
Eppelheimer Straße 82
D-69123 Heidelberg
Germany

Tel.: +49 (0) 6221/701-0

Hotline Tel.: +49 (0) 6221/701-1444
Hotline Fax: +49 (0) 6221/701-1382

Email Hotline: Desst.helpline@de.abb.com

Web: www.abb.de/sto

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Although this program has been developed with great care and intensively tested, ABB STOTZ-KONTAKT GmbH cannot guarantee the suitability of this program for any purpose not confirmed by us in writing.

Guarantee claims shall be limited to the right to require rectification. Liability for any damages which may have arisen from the use of this program or its documentation shall be limited to cases of intent.

We reserve the right to modify our products and their specifications at any time in as far as this contribute to technical progress. The version of the manual supplied with the program applies.

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1 Introduction

1.1 About CANopen Master DTM

This manual describes the usage of the ABB CANopen Master DTM. The DTM is used for the configuration of CANopen Master devices within a FDT framework.

This manual describes the device parameters and diagnostic functions.

1.2 Requirements

System Requirements

- Windows® 2000/ Windows® XP
- CD ROM drive
- Graphic resolution: min. 1024 x 768 pixel or higher
- Keyboard and mouse

Requirements ABB CANopen Master DTM

To configure an ABB CANopen Master device with the DTM the following requirements have to be accomplished:

- Completed hardware installation of a DTM-compatible ABB CANopen Master device
- FDT/DTM V 1.20 compliant frame application
- Installed FDT Framework
- Open Project in FDT Framework
- Loaded DTM in the Device Catalog of the FTD Framework

1.3 Dialog Structure of the CANopen Master DTM

The dialog window of the DTM is divided in three different areas:

- A header which contains the **General Device Information**.
- The **Pages Tree-View** displayed as tree structure.
- The **Setting, Configuration and Diagnosis Pages**.

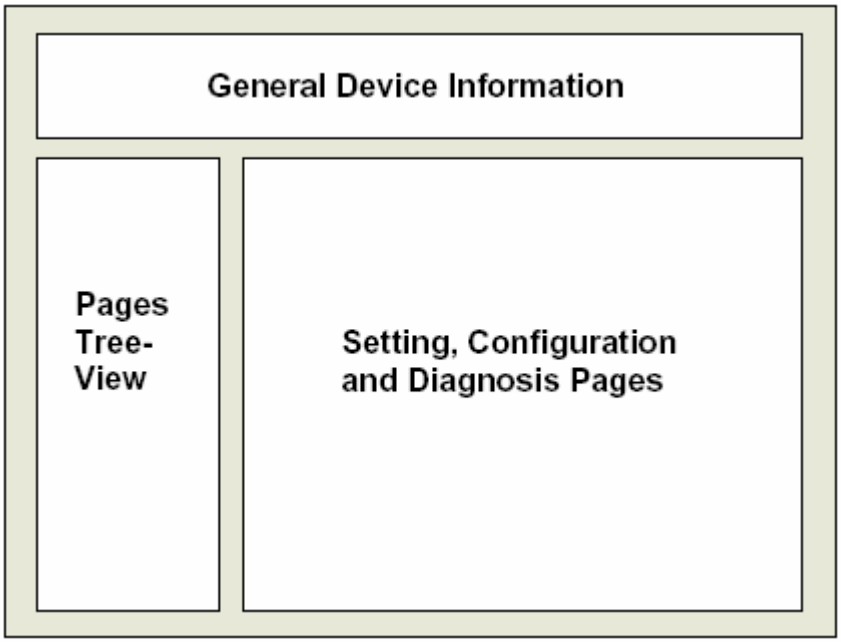


Figure 1: Dialog Structure of CANopen Master DTM

1.3.1 General Device Information

The general device information contains specifications of the device. This indication is only for information and can not be edited

The indicated information is **IO Device** (name of the device), the **Vendor**, the **Device ID** and the **Vendor ID**.

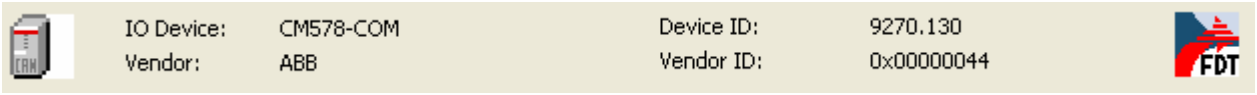


Figure 2: General Device Information

1.3.2 Pages Tree-View

The left side shows the pages tree-view:

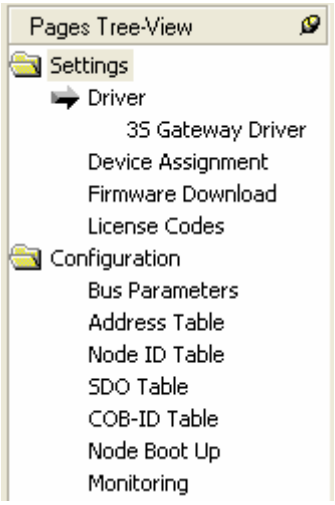


Figure 3: Pages Tree-View Settings and Configuration

Settings	
Driver	On the page **driver** the selection list of the existing drivers is displayed. For the individual drivers additional parameters can be adjusted if necessary. Further information you find in the section *Driver* on page 16.
Device Assignment	This page contains the **Device Assignment**, where the favored driver can be assigned. Further information about this you find in section *3S Gateway Driver* on page *19* .
Firmware Download	The dialog on the page **Firmware Download** is used to load a new firmware into the device. A detailed description can be found in section *Firmware Download* on page *21*.
License Codes	On the page **License Codes** current device data are displayed and the license code can be entered. Further information to this item you find in the section *License Codes* on page 23.
Configuration	
Bus Parameters	The **Bus Parameters** are the basis of an operating data exchange. For further information see section *Bus Parameter* on page *26*.
Address Table	The **Address Table** shows a list of all addresses used in the process data image. Further information see section *Address Table* on page *29*.
Node ID Table	The **Node ID Table** shows a list of all configured Nodes of the master. Further information see section *Node ID Table* on page *31*.
SDO Table	The **SDO Table** shows an overview of the transmitted objects during the Node boot up phase for each Node. Further information see section *SDO Table* on page *32*.

Further see next page

COB ID Table	The **COB ID Table** displays a list for each Node which message numbers in the CAN network are occupied by the respective Node. Further information see section *COB ID* Table on page *33*.
Node BootUp	The **Node BootUp** defines the start up behavior of the master with regard to each individual node and is described in section. Further information see section *Node BootUp* on page ***34.***
Monitoring	The **Monitoring** is used to configure the monitoring between different Nodes. Further information see section *Monitoring* on page *36*.

Table 1: Overview Settings and Configuration Pages

1.3.3 Setting, Configuration and Diagnosis Pages

On the setting, configuration and diagnosis pages the device specific settings and the configuration can be made. These one can be edited by entering parameter values or via pull-down menus. On the diagnosis pages diagnosis information out of or to the device can be red and displayed. Therefore a connection to the device is required.

Detailed information to the single pages you can find below in this manual. Subsequently the sections with the descriptions to the single setting, configuration and diagnosis pages for the ABB CANopen Master DTM are listed.

Settings

Contents	Page
Overview Settings	*15*
Driver	*16*
Device Assignment	*19*
Firmware Download	*21*
License Codes	*23*

Table 2: Descriptions Setting Pages

Configuration of the ABB CANopen DTM Master

Contents	Page
Bus Parameter	***26***
Address Table	***29***
Node ID Table	***31***
SDO Table	***32***
COB ID *Table*	***33***
Node BootUp	***34***
Monitoring	***36***

Table 3: Descriptions Configuration Pages

Diagnosis

Contents	Page
Firmware Diagnosis	**40**
Bus Diagnosis	**41**
Station Diagnosis	**44**

Table 4: Descriptions Diagnosis Pages

Extended Diagnosis

Contents	Page
PLC - Common Variables	*46*
CAN - Common Variables	*47*
CAN - Node Running States	*49*
CAN - Global State Field	*50*
CAN - Communication Error	*52*
Queues	*53*
CAN - Nodeguard inputqueue	*53*
CAN - Management inputqueue	*54*
CAN - Emergency inputqueue	*55*
CAN - Transmit inputqueue	*56*
CAN - CMS Domain Services	*57*

Table 5: Descriptions Pages Extended Diagnosis

1.4 Status Bar

The Status Bar displays information about the current state of the DTM. The meaning of the icons is explained in the following:

Figure 4: Status Bar

Number	Meaning	
1	Name of the Master DTM manufacturer: ABB Stotz-Kontakt GmbH	
2	Connection State Icon closed = Device is online Icon not closed = Device is offline	
3	Offline data: The displayed data are read out from the configuration file (database).	
	Online data: The displayed data are read out online from the device.	
4	Configuration was changed This symbol indicates, that the configuration was changed and these changes have not been saved until yet. When saving the actual configuration, this symbol expires.	
5	Diagnosis is activated	
6	The status of the device is displayed first as icon (6) and below it is indicated in plain text (7). The following states can appear:	
	Info	
	Warning	
	Error	

Table 6: Elements of the Status Bar

1.5 Dialog Buttons

OK

If it is confirmed with **OK**, the settings are stored and the dialog is closed.

Cancel

Clicking the **Cancel** button it is asked to confirm the loss of all modifications made before. If changes at the configuration were made, a safety inquiry follows whether the changes are to be stored or not. Subsequently, the dialog is closed.

Apply

The modifications are stored temporary to the frame applications database when clicking the **Apply** button. The dialog remains opened.

Reset

By means of the **Reset** button changes in the configuration of the frame application are rejected.

Help

For the configuration and diagnosis of the DTM a help file is available. This is opened by clicking the **Help** button.

Selecting, creating, deleting Table Line

To select a line in a table or to create a new one or to delete one the available arrow buttons can be used.

Button	Meaning
	To select the table's first line use the button **First Line**.
	To select the previous line in the table use the button **Previous Line**.
	To select the next line in the table use the button **Next Line**.
	To select the last line in the table use the button **Last Line**.
	The button **Create a new Line** inserts new lines into the table.
	The button **Delete selected Line** deletes the selected line from the table.

Table 7: Meaning of the Buttons selecting, creating, deleting Table Line

Activating / Deactivating Options

To activate an option set a hook into the checkbox.

To deactivate an option remove the hook from the checkbox.

☑ Activated / ☐ deactivated

2 Settings

2.1 Overview Settings

Pages tree-view **Settings** for the CANopen Master DTM:

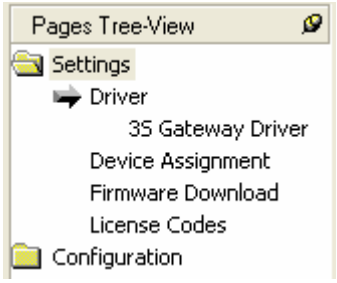


Figure 5: Pages Tree-View - Settings

Descriptions to the setting pages for the CANopen Master DTM:

CANopen Master DTM Settings	Page
Driver	*16*
Selecting Driver	*16*
3S Gateway Driver	*17*
Device Assignment	*19*
Scanning Device	*19*
Assigning Device	*20*
Firmware Download	*21*
License Codes	*23*

Table 8: Setting Pages - CANopen Master DTM

2.2 Driver

By means of the driver selection it is determined how the CANopen DTM will communicate with the device which will be assigned later by the device assignment (see section *3S Gateway Driver* on page 19).

2.2.1 Selecting Driver

To select one or several drivers select **Settings > Driver** from the pages tree-view. The **Driver** dialog with the selection list of the available drivers is shown. Every recognized or installed driver is displayed.

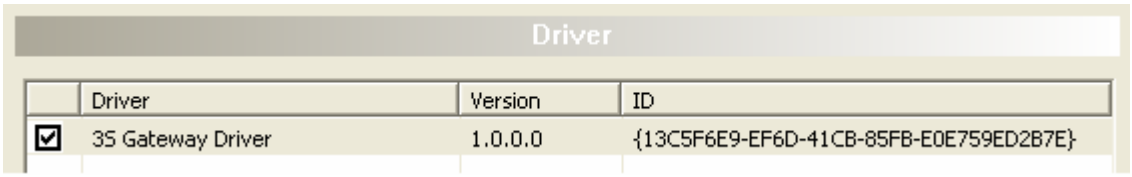


Figure 6: Selection List Driver

Select the driver/s to be used in the dialog **Driver** from the selection list (see figure *Selection List Driver* on page 16).

Only drivers can be selected, the connection specifications of which are supported. Only then a communication between the corresponding master DTM and the device can be established.

Note: In the device assignment (see section *Device Assignment*, on page 19) a connection from the master DTM to the device shall be established by trying to scan the selected driver/s.

Checkbox	Description
☐	Driver is not selected.
☑	Driver is selected.

Table 9: Checkbox Driver

Mark the desired driver/s in the driver selection list by clicking the appropriate checkbox.

2.2.2 3S Gateway Driver

In the dialog window *3 S Gateway Driver* settings can be made on how the configurator can communicate with the device.

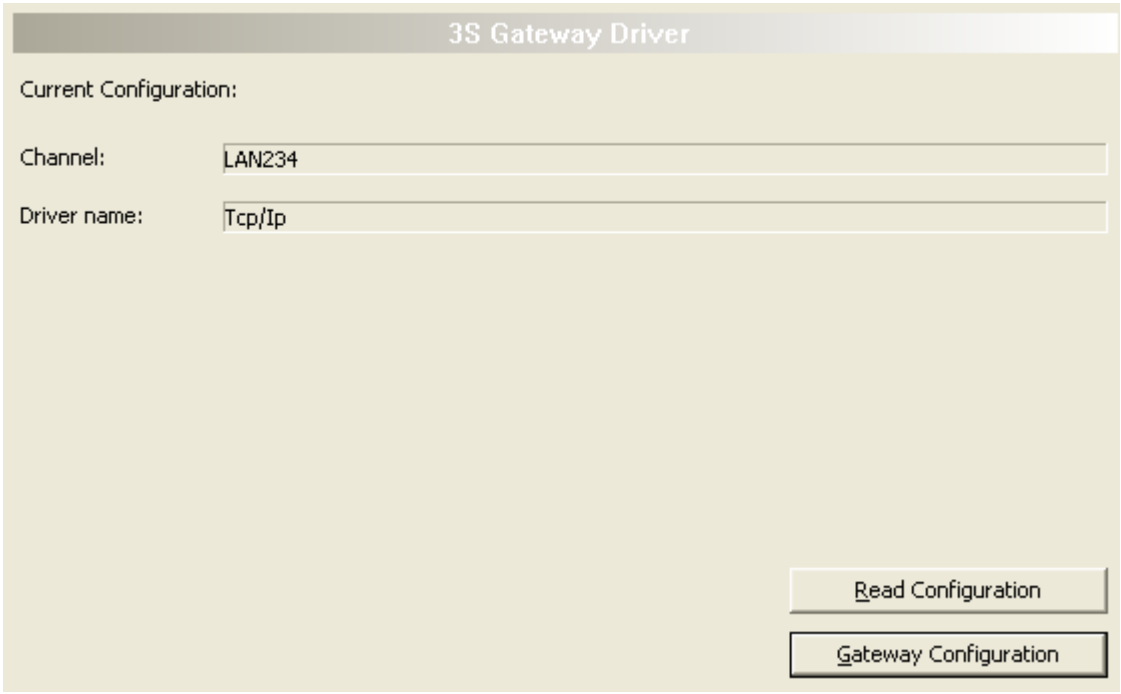


Figure 7: Settings > Driver > 3S Gateway Driver

Term in the dialog	Meaning
Current Configuration	Shows the current configuration of the 3 S Gateway driver.
Read Configuration	Actualizes the display under *Current Configuration*
Gateway Configuration	Opens the window *'Kommunikationsparameter'* (*Communication Parameters*, see figure *3S Gateway Driver - Communication Parameters* on page 18). The communication parameters for the driver configuration can be preset here.

Table 10: Description to the 3S Gateway Driver Dialog

In the window *'Kommunikationsparameter'* the communication parameters for the driver configuration can be adjusted.

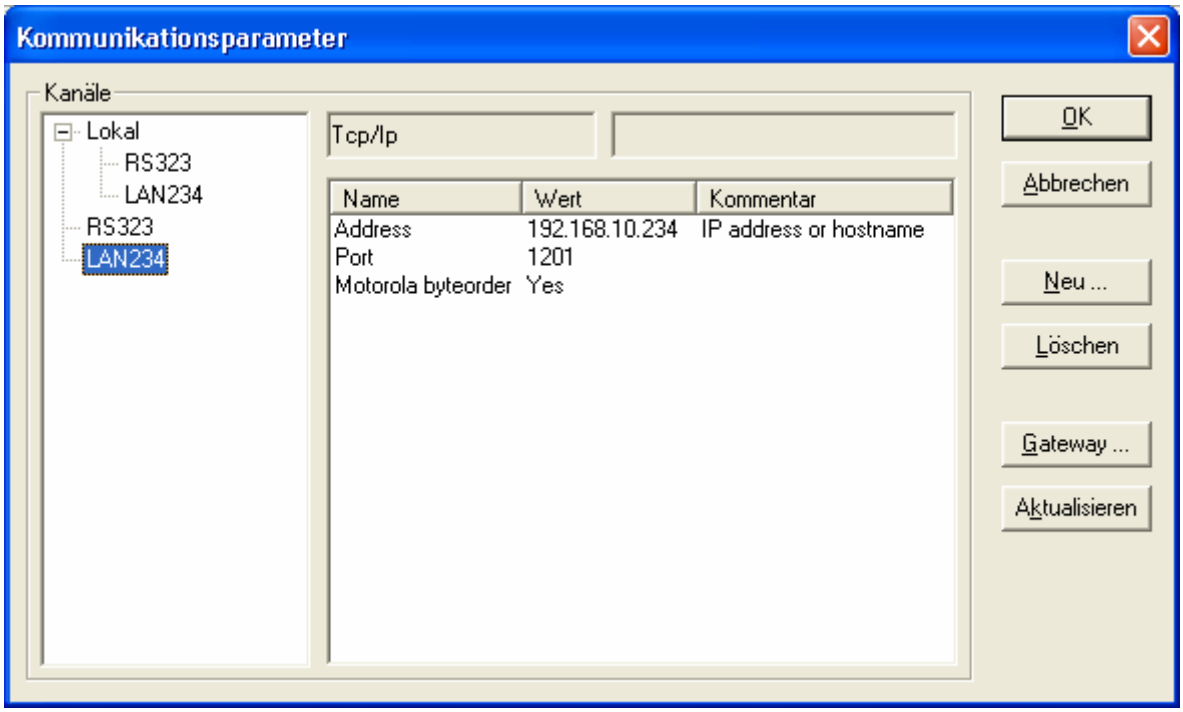


Figure 8: 3S Gateway Driver - Communication Parameters

Note: The detailed description to the dialogue window *Kommunikationsparameter* (communication parameter) is in the ABB manual "Systems Engineering of the CPUs/Coupler".

2.3 Device Assignment

To establish an operating communication between the DTM and a device, a physical device must be assigned to the master DTM. This is done in the **Device Assignment**.

To access the **Device Assignment** dialog, select **Settings > Device Assignment** from the pages tree-view. The dialog **Device Assignment** is displayed:

Note: Precondition for the device assignment is the previous selection of one or more drivers (see section *Driver* on page 16).

2.3.1 Scanning Device

To start the scanning process, click to the button **Scan**.

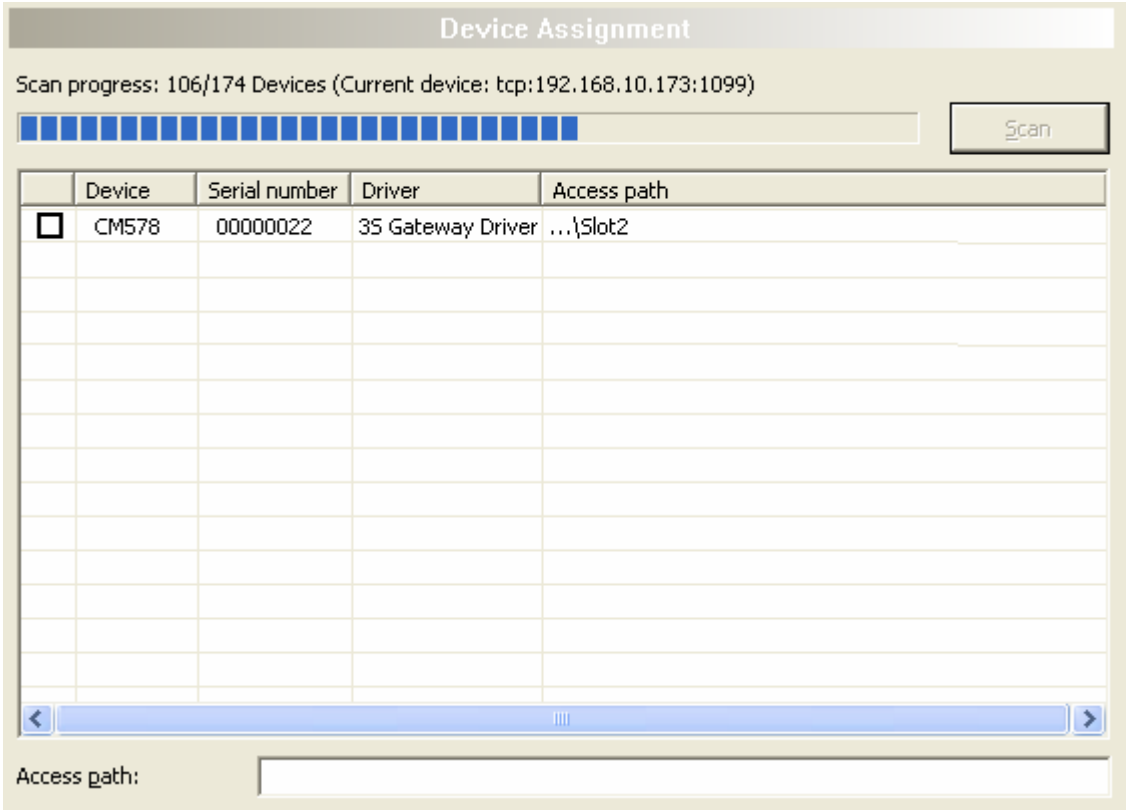


Figure 9: Device Assignment - detected Devices

In the table **Device Assignment** all devices are indicated, which can be connected with the DTM via the drivers selected before.

For every found device the device name, the serial number, the driver and the access path are displayed.

In the field **Access Path** the access path to the selected device is displayed.

2.3.2 Assigning Device

To assign a driver to a device, first the checkbox at the left side of the desired device/ driver must be marked by a hook.

Checkbox	Description
☐	Device is still not assigned.
☑	Device is assigned.

Table 11: Device Assignment - Checkbox Device

Note: A connection can always only be build up to exactly one device.

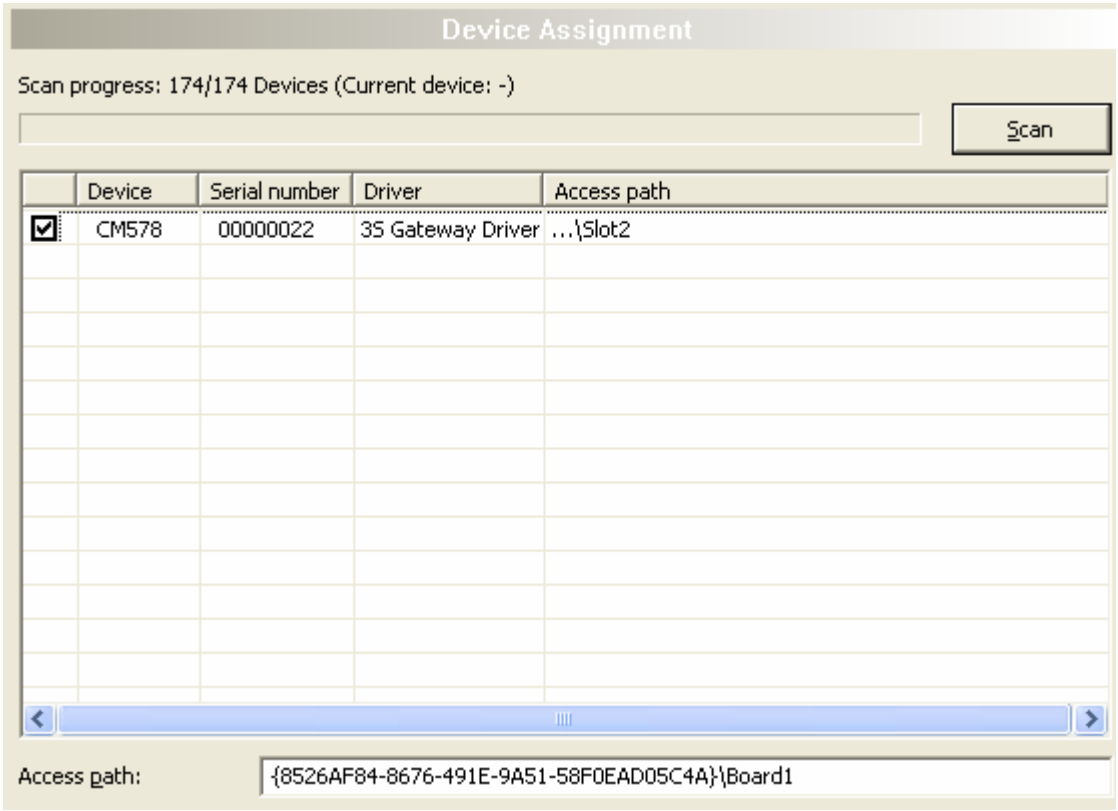


Figure 10: Device Assignment - Assigning Device

Further the selection is to be confirmed by **OK** or **Apply**. Now the selected device is connected with the master DTM.

By clicking to the button **Cancel** the Device Assignment dialog will be closed without any assignment or changes of an assignment.

Note: To analyze errors which have been occurred during assignment, the diagnostic function **ODMV3 Diagnostic Application** can be used (for further information see manual **ODMV3 Diagnostic Application**).

2.4 Firmware Download

Using the **Firmware Download** dialog a firmware can be transferred to the device, to e. g. load a later version. In this case open the **Firmware Download** dialog.

To access the **Firmware Download** dialog, select **Settings > Firmware Download** from the pages tree-view. The dialog **Firmware Download** is displayed.

Note: For firmware download a device must be assigned to a driver. See section *Driver* on page 16.

In order to select a firmware file, click on the **Browse** button. The dialog **Select Firmware File** opens, where the firmware file to be loaded can be selected. A description about this dialog you find in section *Selecting Firmware* on page *22*.

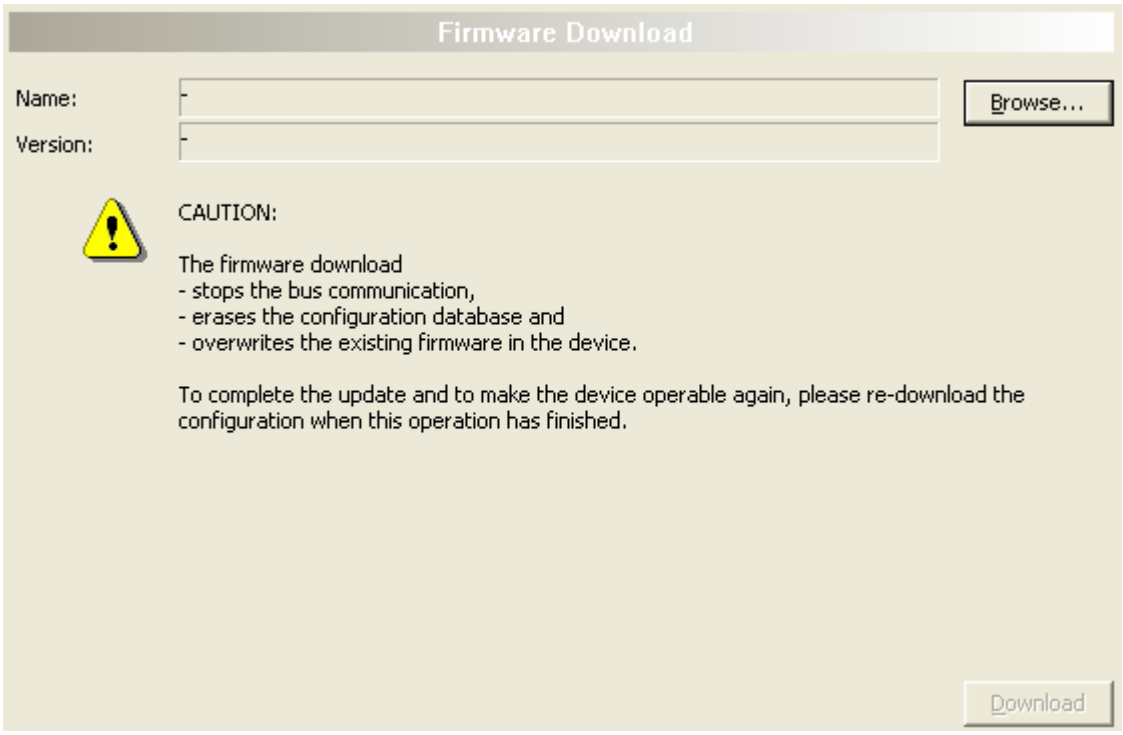

Firmware Download
Name:
Version:
Browse...
CAUTION:
The firmware download
- stops the bus communication,
- erases the configuration database and
- overwrites the existing firmware in the device.
To complete the update and to make the device operable again, please re-download the configuration when this operation has finished.
Download

Figure 11: Firmware Download

After opening the firmware file, the **Name** and the **Version** of the firmware are indicated in the upper section of the dialog.

By clicking the **Download** button, a safety query appears, if you really want to download the new firmware. Confirm this query with **Yes**, to download the new firmware.

2.4.1 Selecting Firmware File

In the **Select Firmware File** dialog window a firmware file can be selected. Therefore select the firmware to be loaded by clicking on it and confirm this selection by clicking on the **Open** button.

In the lower section of the dialog window **Select Firmware File** the following information is shown:

- **File name**
- **File type**
- **Recent folders** and
- **Firmware** (version number).

2.5 License Codes

To access the **License Codes** dialog, select **Settings > License Codes** from the pages tree-view. The dialog **License Codes** is displayed.

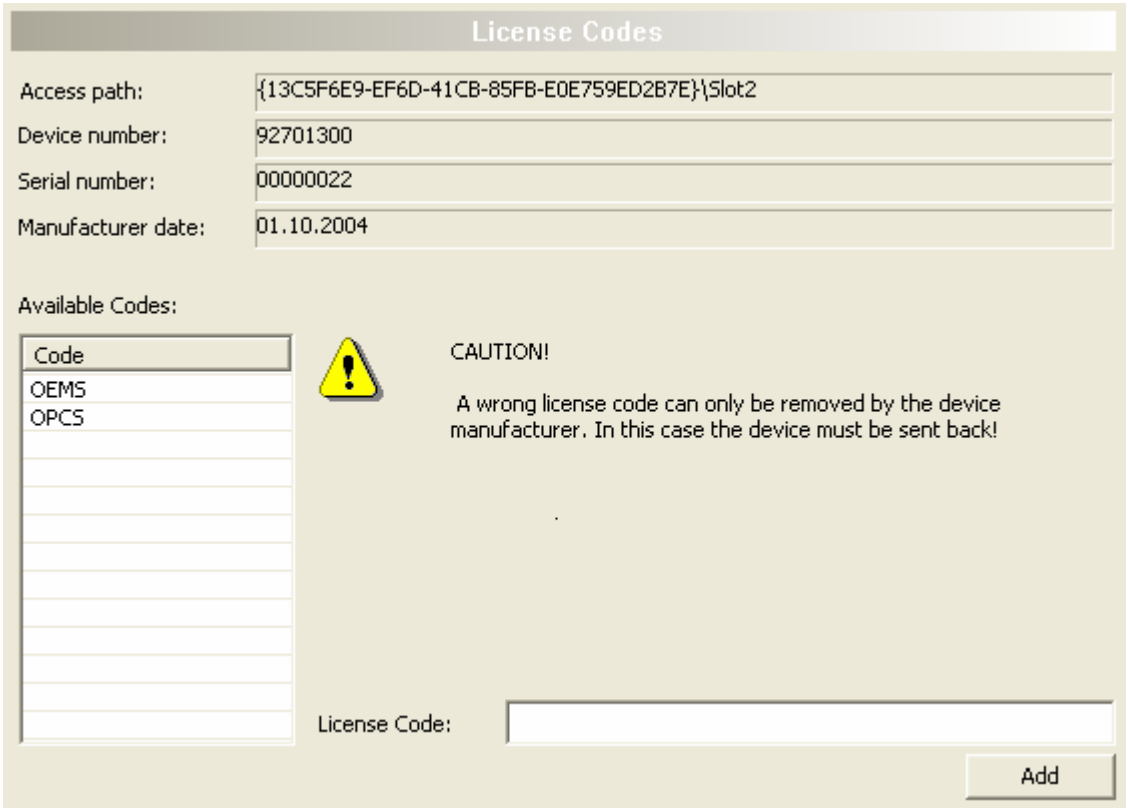


Figure 12: License Codes

After the device has been assigned (see section *3S Gateway Driver* on page 19), the device data and the available license codes are displayed in the **License Codes** dialog.

If a license code must be registered to the device, enter the license code into the window **License Code** and click to the **Add** button.

The resulting character code for the device is saved at the device and is displayed in the **License Codes** dialog under **Available Codes**.

3 Configuration

3.1 Overview Configuration

Pages Tree-View **Configuration** for the CANopen Master DTM:

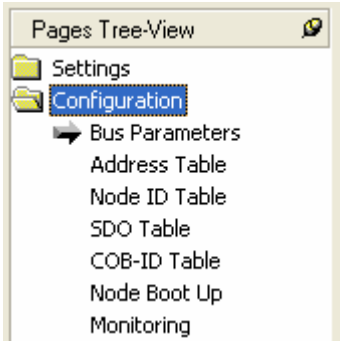


Figure 13: Pages Tree-View - Configuration

Descriptions to the configuration pages for the CANopen Master DTM:

Configuration	Page
Bus Parameter	***26***
Device Description	***26***
Node Settings	*27*
Sync Master Settings	*28*
29 Bit COB ID	*28*
Address Table	***29***
CSV Export	*30*
Node ID Table	***31***
SDO Table	***32***
COB ID Table	***33***
Node BootUp	***34***
Monitoring	***36***
Node Guarding Protocol	*37*
Heartbeat Protocol	*38*

Table 12: Configuration Pages - CANopen Master DTM

3.2 Bus Parameters

The **Bus Parameters** are the basis of an operating data exchange. This section contains information for setting the Bus Parameters as well as the description of the individual parameters.

Attention: Check that all CANopen Nodes support also the selected baud rate.

Basic rule: The baud rate must be set the same for all devices. The Node ID on the other hand must differ from Node to Node.

3.2.1 Device Description

Figure 14: Bu Parameters > Device Description

The symbolic name of the device is displayed in the field **Device Description** and can be changed via entering.

3.2.2 Node Settings

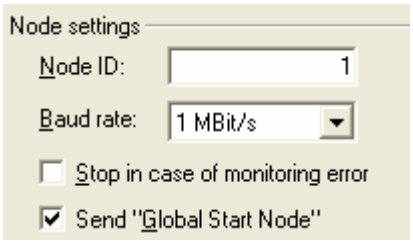


Figure 15: Bus Parameters > Node Settings

Bus Parameters	Meaning
Node ID	The Node ID is necessary for the addressing of the device at the bus and has to be unique in the network. Therefore it is not allowed to use this number two times in the same network. Range of value: 1 … 127
Baud rate	The Baud rate is the data transfer speed: number of Bits per second. The following baud rates are available: 10 kBit/s 20 kBit/s 50 kBit/s 100 kBit/s 125 kBit/s 250 kBit/s 500 kBit/s 800 kBit/s **1 Mbit/s**
Stop in case of Monitoring Error	Master stops if a monitoring error (Node Guard or Heartbeat Error) appears. This function defines the behavior of the Master if the communication is interrupted to at least one Node. If this function is enabled (basic setting: deactivated), the Master will also stop the communication to all further Nodes which were still responding and active. If this function is disabled, a lost communication to one Node has no influence on the communication of the still present Nodes. For all the error affected Nodes the master remains in the state to try the reestablishment of the communication again.
Send “Global Start Node“	After the Master started all Nodes configured individually first, it sends a “Global Start Node“ afterwards, in order to synchronize all Nodes again, if this function is enabled.

Table 13: Bus Parameters > Node Settings

3.2.3 Sync Master Settings

For the SYNC telegram sent from the CANopen Master **COB-ID** and **Cycle Period** can be set.

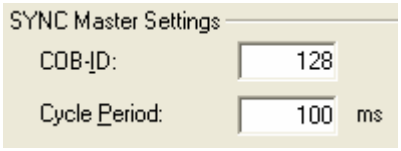


Figure 16: Bus Parameters > Sync Object

Sync Object	Range of value
COB ID	**128**, 1664 … 1759, 1761 … 1792, 1920 … 2047
Cycle Period	0 … **100** … 1000

Table 14: Bus Parameters > Sync Object

The value 0 for the **Cycle Period** deactivates the SYNC telegram sending.

Note: Cycle periods which are too small can overload the network by too many SYNC telegrams.

3.2.4 29 Bit COB ID

Here under **Enable 29 bit COB-ID** the size of the COB ID can be set to 29 bit. The default setting is 11 bit.

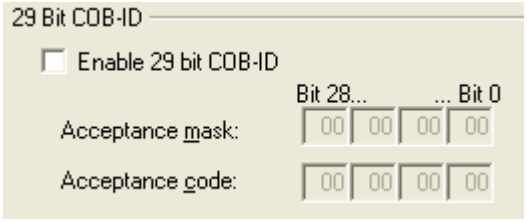


Figure 17: Bus Parameters > 29 Bit COB ID

Further for the master a receive filter for the COB-IDs can be defined.

Acceptance Mask

Here it is possible to define the bits, the filter uses. In other words: All not set bits will not be filtered out.

Acceptance Code

Those are the bits set to filter the IDs. Those bits must have the value ‘1’ in the acceptance code and the reaching COB ID to pass the filter. If a bit is not set in the **Acceptance Mask**, the filter will pass the message anyway.

3.3 Address Table

The **Address Table** shows a list of all addresses used in the process data image. The displayed addresses refer to the used Master.

Representation

The representation of the input- and output data Node-ID, Object index, COB-ID, Length and Address can be decimal or hexadecimal. Therefore the corresponding representation has to be selected in the selection box **Representation**.

Figure 18: Address Table > Representation

Address Table

The addresses for the storage of the **input-** and **output data** are assigned automatically for PDO mode by the DTM on the basis of information about data type and data length.

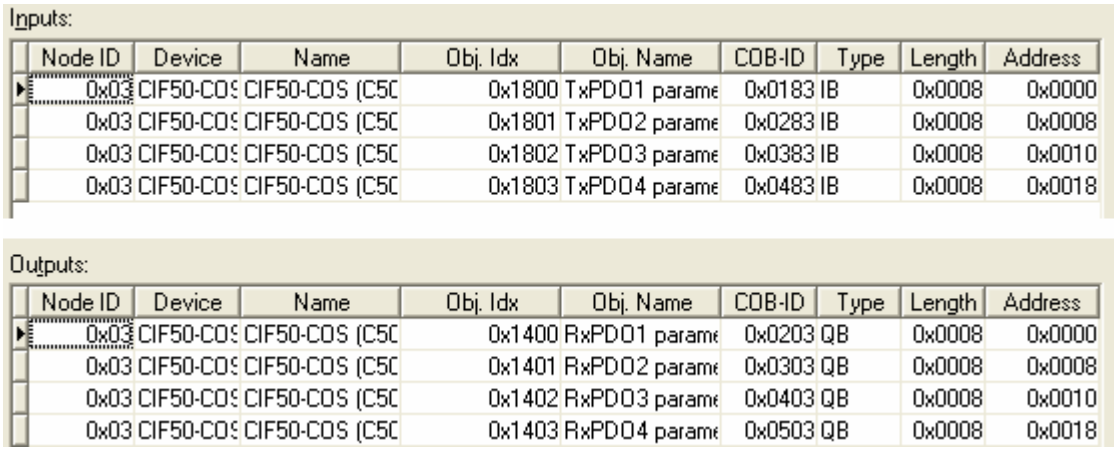

Inputs:
Node ID | Device | Name | Obj. Idx | Obj. Name | COB-ID | Type | Length | Address
0x03 CIF50-COS CIF50-COS (C5C 0x1800 TxPDO1 parame 0x0183 IB 0x0008 0x0000
0x03 CIF50-COS CIF50-COS (C5C 0x1801 TxPDO2 parame 0x0283 IB 0x0008 0x0008
0x03 CIF50-COS CIF50-COS (C5C 0x1802 TxPDO3 parame 0x0383 IB 0x0008 0x0010
0x03 CIF50-COS CIF50-COS (C5C 0x1803 TxPDO4 parame 0x0483 IB 0x0008 0x0018
Outputs:
Node ID | Device | Name | Obj. Idx | Obj. Name | COB-ID | Type | Length | Address
0x03 CIF50-COS CIF50-COS (C5C 0x1400 RxPDO1 parame 0x0203 QB 0x0008 0x0000
0x03 CIF50-COS CIF50-COS (C5C 0x1401 RxPDO2 parame 0x0303 QB 0x0008 0x0008
0x03 CIF50-COS CIF50-COS (C5C 0x1402 RxPDO3 parame 0x0403 QB 0x0008 0x0010
0x03 CIF50-COS CIF50-COS (C5C 0x1403 RxPDO4 parame 0x0503 QB 0x0008 0x0018

Figure 19: Address Table

The table **Input** or **Outputs** shows the list of all modules configured for this Master

Column	Meaning
Node-ID	Node-ID of the Slave device
Device	Device Name of the Slave device
Name	Designation for the Slave device
Obj. Idx	Object Index
Obj. Name	Object Name
COB-ID	COB-ID of the CAN telegram
Type	Input data type or output data type
Length	Input data length or output data length
Address	Output data offset address or input data offset address

Table 15: Address Table - Input / Outputs

Sort Addresses

It is possible to sort the addresses by clicking on the individual table columns.

3.3.1 CSV Export

The **CSV Export** button allows to export input- and output addresses as CSV file (CSV = comma separated value). The generated data can be opened with a spreadsheet application.

3.4 Node ID Table

The **Node ID Table** shows a list of all in the master configured Nodes.

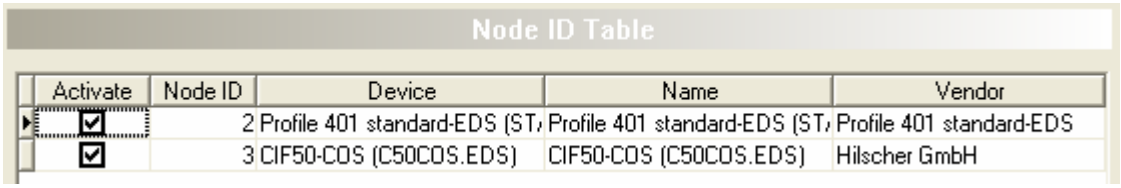


Figure 20: Node ID Table

The column **Node ID** shows the addresses of the devices in the network. The address of the selected device can be changed by clicking on it.

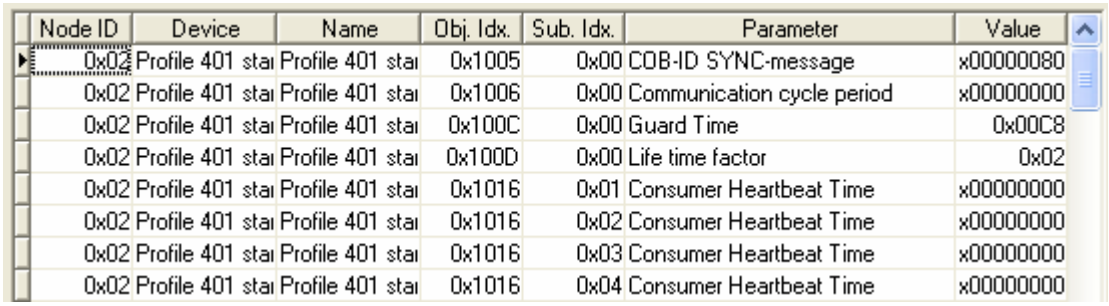
The columns **Device**, **Name** and **Vendor** are not editable and show the following information:

Column	Meaning
Device	name of the device from the EDS file
Name	symbolic name of device
Vendor	vendor of device

Table 16: Node ID Table

3.5 SDO Table

The **SDO Table** shows an overview of the transmitted objects during the Node BootUp phase for each Node. Apart from the **Node ID** for each entry the **Object-** and **Sub index** is displayed with parameter name and the pertinent value.



Node ID	Device	Name	Obj. Idx.	Sub. Idx.	Parameter	Value
0x02	Profile 401 stai	Profile 401 stai	0x1005	0x00	COB-ID SYNC-message	x00000080
0x02	Profile 401 stai	Profile 401 stai	0x1006	0x00	Communication cycle period	x00000000
0x02	Profile 401 stai	Profile 401 stai	0x100C	0x00	Guard Time	0x00C8
0x02	Profile 401 stai	Profile 401 stai	0x100D	0x00	Life time factor	0x02
0x02	Profile 401 stai	Profile 401 stai	0x1016	0x01	Consumer Heartbeat Time	x00000000
0x02	Profile 401 stai	Profile 401 stai	0x1016	0x02	Consumer Heartbeat Time	x00000000
0x02	Profile 401 stai	Profile 401 stai	0x1016	0x03	Consumer Heartbeat Time	x00000000
0x02	Profile 401 stai	Profile 401 stai	0x1016	0x04	Consumer Heartbeat Time	x00000000

Figure 21: SDO Table

Representation

The representation of the values can be decimal or hexadecimal. Therefore the corresponding representation has to be selected in the selection box **Representation**.

Figure 22: SDO Table > Representation

Column	Meaning
Node ID	Station address of the Slave device in the network
Device	Name of device from EDS file
Name	Symbolic name of device (defined by the user)
Obj. Idx.	Object index of a SDOs (from EDS file)
Sub. Idx	Sub index: 0x1 and 0x2 mandatory, 0x3, 0x5 optional (from EDS file)
Parameter	Parameter name identified by object index and sub index (from EDS file)
Value	Value of the Parameters (set in Slave DTM)

Table 17: SDO Table

Sort Table

It is possible to sort the table by clicking on the individual table columns.

3.6 COB ID Table

In the **COB ID Table** a sorted list for each Node is shown, which message numbers in the CAN network are occupied by the respective Nodes.

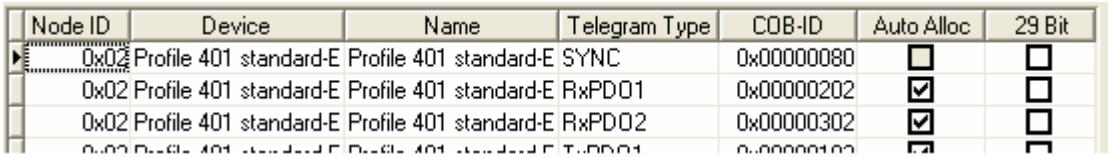


Figure 23: COB ID Table

Representation

The representation of the values can be decimal or hexadecimal. Therefore the corresponding representation has to be selected in the selection box **Representation**.

Figure 24: COB ID Table > Representation

Column	Meaning
Node ID	Station address of the Slave device in the network
Device	Name of device from EDS file
Name	Symbolic name of device (defined by the user)
Telegram Type	Indication of the telegram type (NODE GUARD, EMCY, RXPD0[x], TXPD0[x],
COB-ID	Identifier of the parameter (set in Slave DTM)
Auto Alloc	Activate / deactivate automatic allocation
29 Bit	Activate / deactivate 29 Bit COB-ID

Table 18: COB ID Table

Sort Table

It is possible to sort the table by clicking on the individual table columns.

3.7 Node BootUp

The Node BootUp defines the network startup behavior of the Master for the particular Node to get it operative. There are different states a Master is running through per Node, till the BootUp sequence is finished for the Node. Each action now is configurable and can be enabled (activated) or disabled (deactivated) here. In the basic setting all actions are activated.

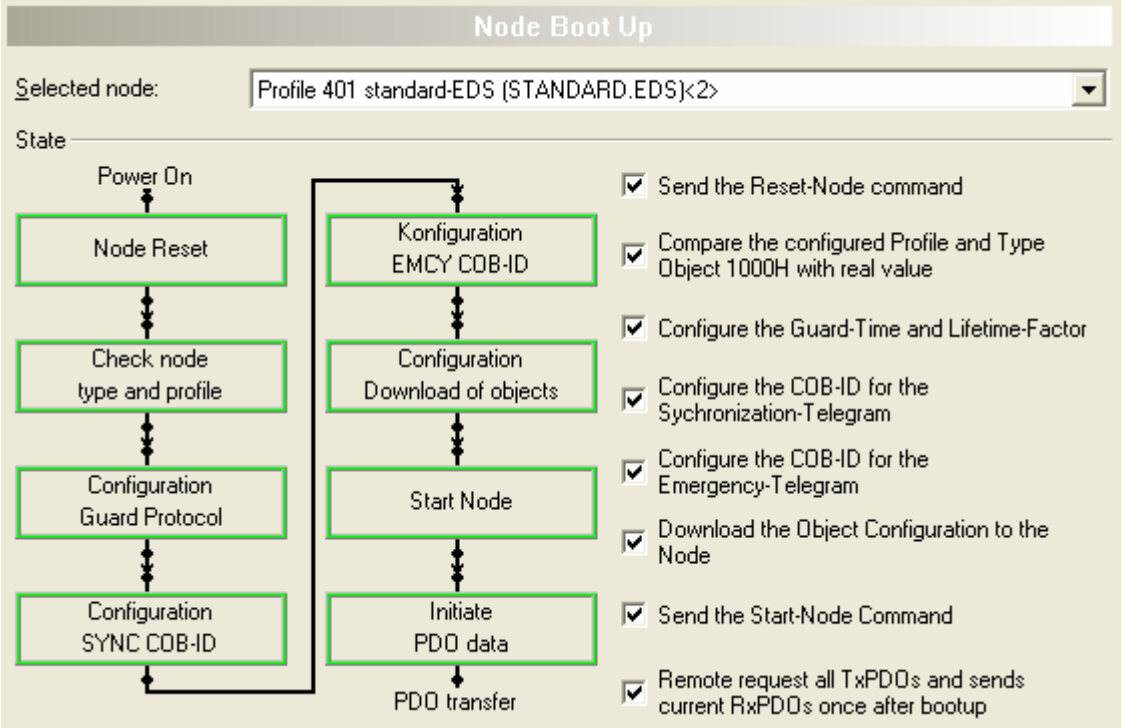

Node Boot Up
Selected node:
Profile 401 standard-EDS (STANDARD.EDS)<2>
State
Power On
Node Reset
Check node type and profile
Configuration Guard Protocol
Configuration SYNC COB-ID
Konfiguration EMCY COB-ID
Configuration Download of objects
Start Node
Initiate PDO data
PDO transfer
Send the Reset-Node command
Compare the configured Profile and Type Object 1000H with real value
Configure the Guard-Time and Lifetime-Factor
Configure the COB-ID for the Sychronization-Telegram
Configure the COB-ID for the Emergency-Telegram
Download the Object Configuration to the Node
Send the Start-Node Command
Remote request all TxPDOs and sends current RxPDOs once after bootup

Figure 25: Node BootUp

Node BootUp parameter	Description
Node Reset	If enabled, the master sends as first the CANopen specific Node Reset Communication command.
Check Node Type and Profile	If enabled, the master will compare the contents of the mandatory Node Object 1000H is the device type with the values that are configured within SYCON.net. If the values are different, the master will report a parameterization error.
Configuration Guarding Protocol	A CANopen has two specific register responsible for the Node guarding protocol. If the item is enabled, the master will write the Guard Time and Life-Time factor of the Node configuration into the corresponding objects of the Node during startup.
Configuration SYNC COB-ID	If the item is enabled, the master will write the SYNC COB-ID of the configuration into the corresponding objects of the Node during startup.
Configuration EMCY COB-ID	If the item is enabled, the master will write the EMCY COB-ID of the configuration into the corresponding objects of the Node during startup.

Further see next page

Configuration download of objects	To get a PDO communication to a Node working, the master has to send all relevant configuration objects to the Node. For example the mapping table, the COB-ID a PDO shall be sent through are covered here. If enabled, all these parameter and also the user specific objects which are added manually in the Node object configuration window are written down to the Node by the master.
Start Node	To reach the operational state in CANopen a Node has to get the CANopen specific Start Node command. If enabled, the master will send the Start Node command to the Node at the end of the boot-up procedure.
Initiate PDO data	This item selects if the installed PDOs shall be automatically written and read by the master directly after the startup once. This ensures that the latest output data which can be found within the Masters output process data area is sent to the Node and that the latest Node input data is read from the Node and be placed into the input process data area.

Table 19: Node BootUp

3.8 Monitoring

Under **Monitoring** the device monitoring is configured:

- Master monitors the single Nodes.
- The single Node monitors the Master.
- A Node monitors another Node.

For this purpose for every node the 'Node-Guarding' or 'Heart-Beat' protocol can be used in a different way.

Note: To be able to use a monitoring function, the node must support 'Node-Guarding' or 'Heart-Beat'.

All configured nodes are shown in the pull-down menu **Selected Node**. Selecting one of those Nodes, the Monitoring of this Node is displayed. This is carried out by choosing one of the Options **Use Node Guarding Protocol** or **Use Heartbeat Protocol**.

Under **Max consumer** the maximum amount of consumer is indicated.

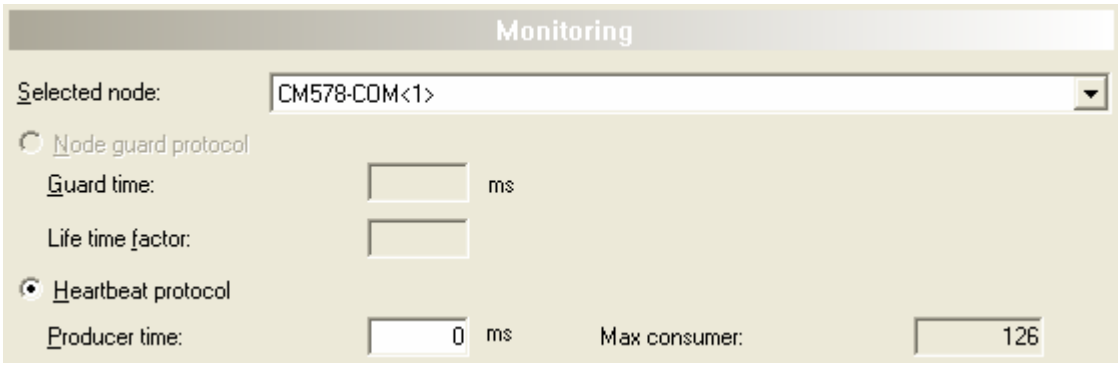


Figure 26: Monitoring

Figure 27: Monitoring - Consumer

Column	Meaning
Active	By selection of the node the monitoring of this node is displayed
Node ID	Station address of the slave device in the network
Device	Name of the device from the EDS file
Name	Symbolic name of the device
Vendor	Vendor of the device
Consumer Time [ms]	Time the node is supervised by the master

Table 20: Consumer Table

3.8.1 Node Guarding Protocol

Functional Principle:

The Master sends cyclically polling telegrams (Remote Request) to the Node (Node Guarding), to check, if the Node still exists on the bus. The Node sends its actual state as answer back to the Master. The Nodes can use the poll telegrams of the Master to supervise the Master on its part (Life Guarding).

Requirement:

The Node has to support the Node Guarding Protocol.

Settings:

The **Guarding Time** is the setting for the supervision of the Node in the view of the Master (Master controls Node). If the communication is running, the Master will poll the Node in the time interval Guarding Time, to check, if the Node is still present in the network or not. If this value is configured with 0, the supervision is disabled in the Master as well as in the Node.

The **Life Time Factor** is the setting for the supervision of the Master in the view of the Node (Node monitors Master). If the communication is running, the Node will monitor the Master in the Guarding Time multiplied with the Life Time Factor as time interval, to check, if the Master is still present in the network or not. If this value is configured with 0, the supervision in the Node is deactivated.

Warning: To reach a stable communication of the Node on the CANopen, the Life Time Factor has to be set to minimal 2.

Note: A Life Guarding can only be used, if the Master carries out a Node Guarding that means Life Guarding presumes Node Guarding.

3.8.2 Heartbeat Protocol

Functional Principle:

A Heartbeat Producer transmits the Heartbeat telegram cyclically with the time interval defined in the field **Producer Time**. One or more Heartbeat Consumer may receive the indication. The relationship between producer and consumer is configurable via the Object Dictionary entries.

Requirements:

In order that the Heartbeat Protocol can be used, the following requirements are necessary:

1) In the ABB Master device the firmware version V1.070 or higher has to be loaded.

2) The Node has to support the Heartbeat Protocol. (EDS obj. 1016).

Settings:

Nodes that are monitored by this Node are shown in the **Consumer** list. If the selected Node shall monitor another Node, the desired node can be added with the button **Add Consumer**.

A dialog appears and shows the actual configured nodes of the network to choose from.

Sorting of the table might be performed by clicking on the columns header.

4 Diagnosis

4.1 Overview Diagnosis

The **Diagnosis Functions** are mostly called up via the context menu of the device. Admittedly the menu direction depends on the frame application and it can vary.

The **Diagnosis** is shown in two dialogs in which the cyclic states on the bus state and the connected devices are shown.

Built Online Connection

To call up the Diagnosis Functions an online connection to the DTM has to be built up. Information about building up an online connection is described in section *Online to the Device* on page *59*.

Pages Tree-View **Diagnosis** for the CANopen Master DTM.

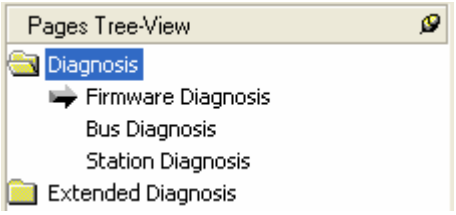


Figure 28: Pages Tree-View - Diagnosis

Descriptions to the diagnosis pages for the CANopen Master DTM:

Diagnose	Page
Firmware Diagnosis	**40**
Bus Diagnosis	**41**
Station Diagnosis	**44**

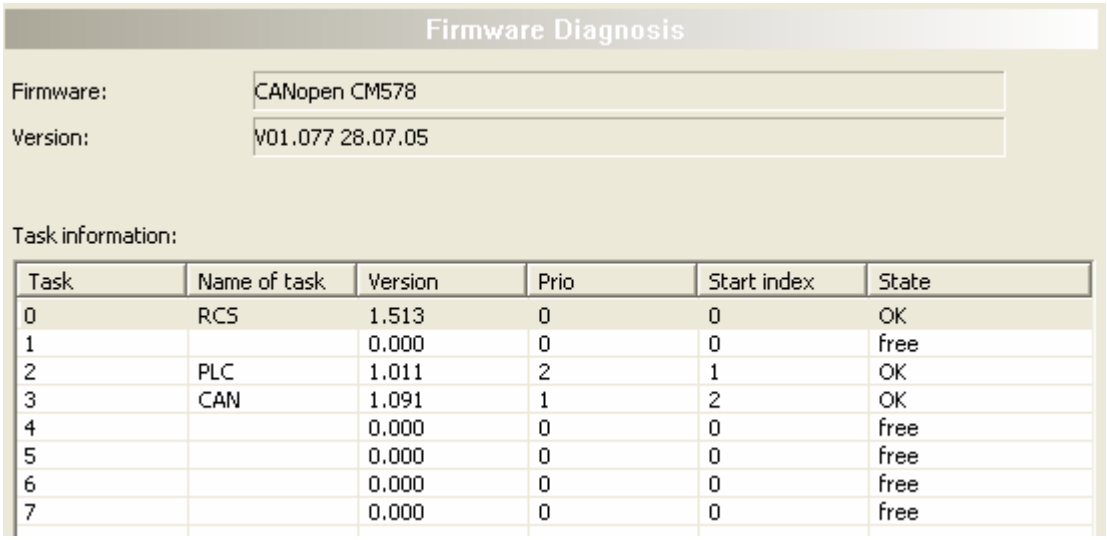
Table 21: Diagnosis Pages CANopen Maste DTM

Information to extended diagnosis you find under *Extended Diagnosis* on page 45 .

4.2 Firmware Diagnosis

In the dialog **Firmware Diagnosis** the actual task information of the firmware is displayed.

Under **Firmware** or **Version** the name of the firmware and version (including the date) are indicated.



Task	Name of task	Version	Prio	Start index	State
0	RCS	1.513	0	0	OK
1		0.000	0	0	free
2	PLC	1.011	2	1	OK
3	CAN	1.091	1	2	OK
4		0.000	0	0	free
5		0.000	0	0	free
6		0.000	0	0	free
7		0.000	0	0	free

Figure 29: Firmware Diagnosis

Task Information:

The table **Task Information** is listing the task information of the single firmware tasks.

Column	Meaning
Task	Task number
Task Name	Name of the task
Version	Version of the task
Prio	Priority of the task
Start Index	Start index of the task
Status	Status of the task

Table 22: Description Table Task Information

4.3 Bus Diagnosis

4.3.1 Master Operation Mode

Figure 30: Bus Diagnosis - Master Operation Mode

The **Master Operation Mode** shows the actual status of the Master:

Status	Meaning
Operate	The CANopen Master is in data exchange. In a data exchange the inputs of the Slaves are received and the output information is sent to the Slaves.
Clear	The Master reads the input data of the Slaves and holds the outputs of the Slaves in a safe condition.
Stop	The Master is in the Stop state that means no user data exchange takes place between the CANopen Master and the Slaves. The Master was stopped by the application program or it had to go in the state Stop because of a bus error.
Offline	The Master does not exist on the bus, it is not on-line. This can happen if no or faulty bus parameters are set for the CANopen Master or if no Slaves are configures. Furthermore this can happen, if the correct bus parameters are set, but the application program has not activated the Master for data exchange on the bus.

Table 23: Bus Diagnosis - Master Operation Mode

4.3.2 Master Status

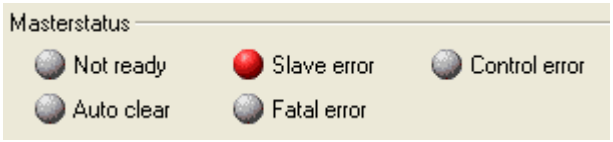


Figure 31: Bus Diagnosis - Master Status

The **Master Status** shows individual bus errors. A pending error is displayed by a red LED. The meaning of the individual errors is described in the following:

Master Status	Meaning
Not Ready	**HOST-NOT-READY** shows, that the application program has not started or it has stopped the CANopen Master.
Auto Clear	The **AUTO-CLEAR-ERROR** displays, that device has stopped the communication to all Slaves and it has reached the auto-clear end state.
Slave Error	The **NON-EXCHANGE-ERROR** shows, that at least one Slave is not in the cyclic data exchange with the CANopen Master.
Fatal Error	A **FATAL-ERROR** has occurred. Because of a heavy bus error no further bus communication is possible.
Control Error	The **CONTROL-ERROR** displays that a parameterization error has occurred.

Table 24: Bus Diagnosis - Master Status

4.3.3 Bus Monitoring

Figure 32: Bus Diagnosis - Bus Monitoring

Bus Monitoring	Meaning
Event	The used CAN chip has detected transmission errors. The number of detected events is counted in the **CAN bus off counter** and the **CAN active to passive counter**. The bit will be set when the first event was detected and will not be deleted until the Master is reset.
CAN active to passive counter	This value indicates a bad transmission quality at the CAN bus. This counter is based on a Transmission Rejected Error of the CAN chip, which is always reported, whenever an increased number of faulty CAN frames were detected.
CAN bus off counter	This counter counts the number of reported bus off events. A bus off event occurs whenever the CAN bus was disturbed substantially during the transmission of CAN frames and therefore the communication chip has to withdraw itself from the bus.
Timeout	A timeout was detected. The number of errors is counted in the **Timeout counter** and in the **RX overflow counter**. The bit is set if the first error occurs and can be reset only by a reset of the Master.
Timeout counter	Whenever a CAN message could not be sent within 250 msec, the transmission is aborted and the counter increases.
Rx overflow counter	An Rx overflow exists, if the Master cannot handle a CAN message before the next message is received because the bus demand is too high.

Table 25: Bus Diagnosis - Bus Monitoring

4.4 Station Diagnosis

4.4.1 Station Status

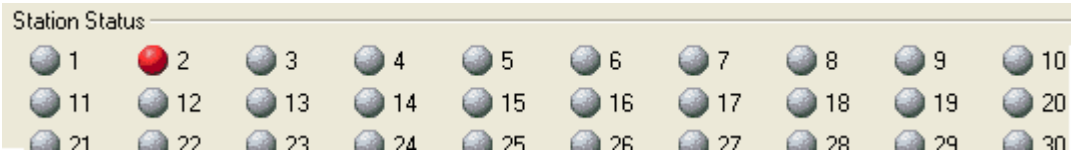


Figure 33: Station Diagnosis - Station Status

Under **Station status** all disposal station addresses (1-127) and their status is shown. If a connection to the device exists, the DTM updates this display cyclically.

4.4.2 Station Error

Below the status a legend is represented, which describes possible states of the station addresses.

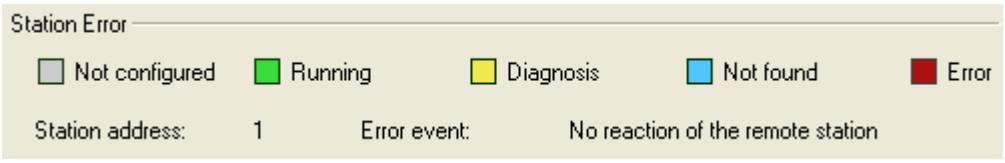


Figure 34: Station Diagnosis - Station Error

Color of the Station Address	Meaning
grey	The device with this station address is not configured.
green	The device with this station address is running.
yellow	Diagnosis is available for the device with this station address.
blue	The device with this station address was parameterized, but not found on the bus.
red	The device with this station address is faulty.

Table 26: Station Diagnosis - Station Error

Among the **Station Error** field information about the appeared error is shown. This display refers to the lowest station address, which signals diagnosis.

The **Node ID** indicates the address of the faulty station. Under **Error Event** the actual error is shown in plain text.

5 Extended Diagnosis

5.1 Overview Extended Diagnosis

The Extended Diagnosis helps to find bus and configuration errors when the standard diagnostic functions are of no further help. The extended diagnosis contains a list of diagnostic structures. These contain online counters, states and parameters.

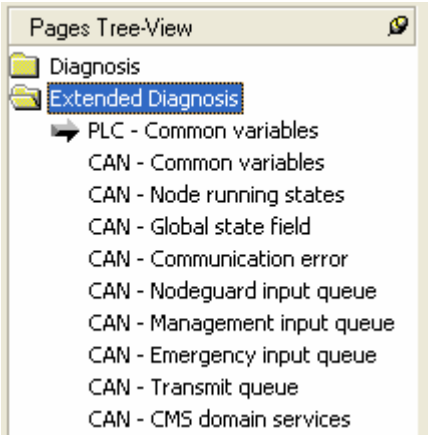


Figure 35: Pages Tree-View - Extended Diagnosis

The following pages for extended diagnosis are available:

Extended Diagnosis	Page
PLC - Common Variables	*46*
CAN - Common Variables	*47*
CAN - Node Running States	*49*
CAN - Global State Field	*50*
CAN - Communication Error	*52*
Queues	*53*
CAN - Nodeguard inputqueue	*53*
CAN - Management inputqueue	*54*
CAN - Emergency inputqueue	*55*
CAN - Transmit inputqueue	*56*
CAN - CMS Domain Services	*57*

Table 27: Pages Extended Diagnosis - Overview

5.1.1 PLC - Common Variables

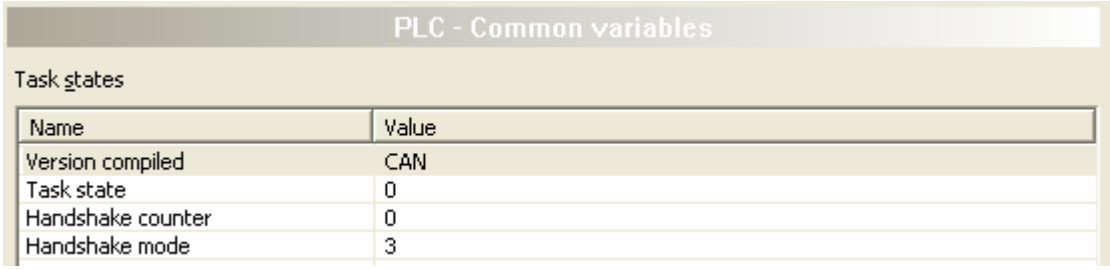


Figure 36: Extended Diagnosis - PLC - Common variables

Name	Value
Version compiled	Hardware
Task state	Task State
Handshake counter	Counter for the performed process data handshakes on the part of application
Handshake mode	This value represents the actual handshake mode between application and device. 0 = Bus synchronous, Device Controlled 1 = Buffered, Device Controlled 2 = No consistence, Uncontrolled 3 = Buffered, Host Controlled 4 = Bus synchronous, Host Controlled

Table 28: Extended Diagnosis > PLC - Common variables

5.1.2 CAN - Common Variables

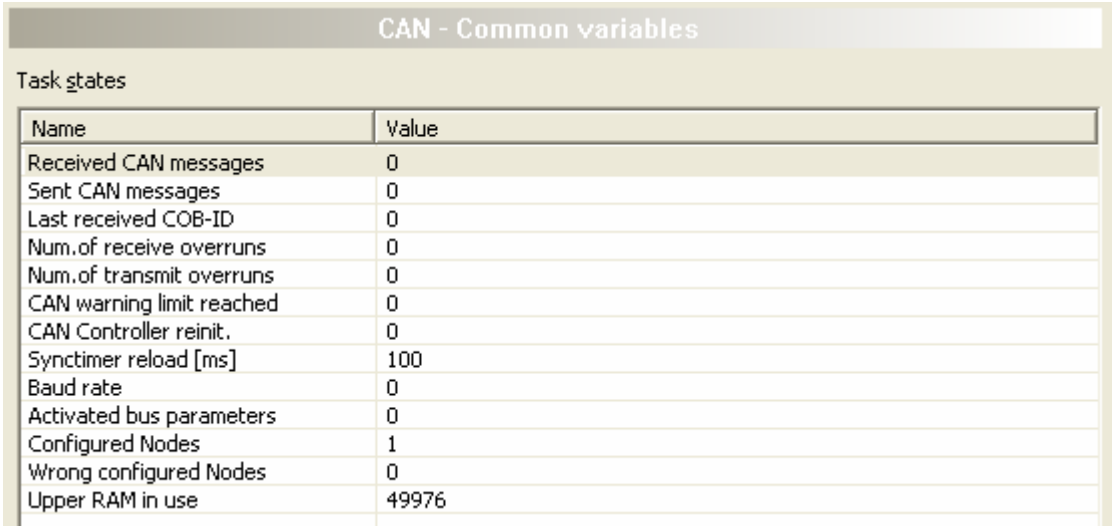


Figure 37: Extended Diagnosis > CAN - Common variables

Name	Value
Received CAN messages	Number of received CAN-Messages
Sent CAN messages	Number of sent CAN-Messages
Last received COB-ID	Last received CAN-Message Header-ID
Num. of receive overruns	This counter is incrementing when to many incoming CAN messages overload the Master. An incremented counter will always cause lost CAN message data, so it should normally contain the value 0.
Num. of transmit overruns	This counter is incrementing when to many outgoing CAN messages overload the Master. An incremented counter will always cause lost CAN message data, so it should normally contain the value 0.
CAN warning limit reached	Our used CAN controller has two internal error frame counter for detected transmission errors one for receive and one for transmit messages. If one of these error counters oversteps a defined value, the bus error counter is incremented by a value of 1.
CAN Controller reinits	If the internal CAN controller error frame counter oversteps a defined limit the controller goes into the bus off state. If this occurs we reinitialize the controller again to be preoperative and increment this counter value. A value unequal 0 is an indication for bad transmission quality, for unsatisfied bus wiring or for low power in the CAN-controller interface driver.
Synctimer reload [ms]	This value shows the actual configured and handled value that was configured as Sync Object Cycle Period in the Bus Parameters.
Baud rate	This value shows numeric the actual baudrate the master is working with: 0 = 1Mbaud, 1 = 800Kbaud, 2 = 500kBaud, 3 = 250Kbaud, 4 = 125kBaud, 5 = 100Kbaud, 6 = 50kBaud, 7 = 20kBaud, 8 = 10kBaud
Activated bus parameters	Value 0, the Master has found a configuration data base coming from the DTM, value 1, the Master device isn't configured and need to be configured via DTM.
Configured Nodes	This value represents the number of found device data sets saved in the database of the DTM.
Wrong configured Nodes	This value indicates, if the Master has detected errors in a device data set which was a containment of the actual downloaded database. For each Slave device that has a wrong entry the counter is incremented by 1.
Upper RAM in use	Used upper memory

Table 29: Extended Diagnosis > CAN - Common variables

5.1.3 CAN - Node Running States

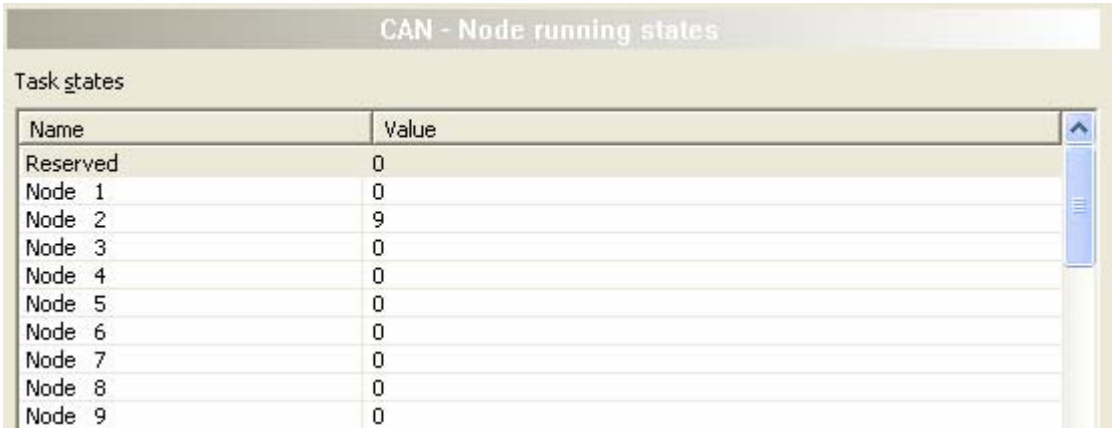


Figure 38: Extended Diagnosis > CAN - Node Running States

To manage the different device states from the view of the Master, the Master device has a memory.

5.1.4 CAN - Global State Field

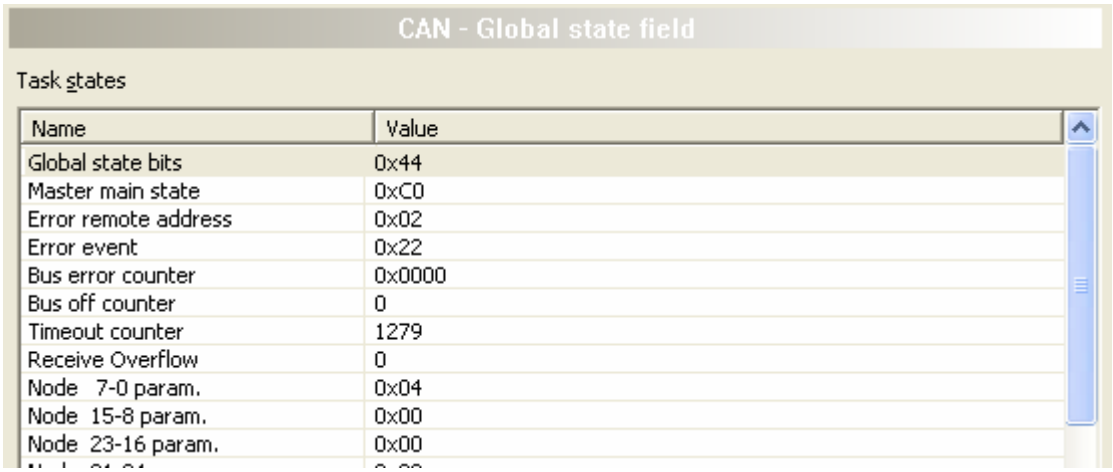


Figure 39: Extended Diagnosis > CAN - Global state field

Name	Wert
Global state bits	The ‘Global state bits’ are described in detail in section *Master Status* on page *42*.
Master main state	A description about the task ‘Master main state’ you find in section *Master Operation Mode* on page *41*.
Error remote address	Displays the lowest station address, which signals diagnosis. Further information about this you find in section *Station Status* on page *44*.
Error event	Indicates the occurred error of the ‘Error remote address’. Further information about this you find in section *Station Status* on page *44*.
Bus error counter	The ‘Bus error counter’ is increased, whenever an increased number of faulty CAN frames were detected. For further information see section *Bus Monitoring* on page *43*.
Bus off counter	This counter counts the number of reported bus-off-events. For further information see section *Bus Monitoring* on page *43*.
Timeout counter	Number of aborted transmission of CAN message. The messages are lost. It's an indication that no other CAN device was connected or responsive at this time to acknowledge the sent message requests. See section *Bus Monitoring* on page *43*.
Receive Overflow	This counter is incremented, if the master is in overrun because of too many received messages. If this counter is unequal 0, the loss of CAN messages can be assumed. Normally this counter should be 0.
Node 7-0 param.	8 Bit parameter state Node 0-7
Node 15-8 param.	8 Bit parameter state Node 8-15
…	…
Node 126-120 param.	8 Bit parameter state Node 56-63
Node 7-0 active	8 Bit active state Node 0-7
Node 15-8 active	8 Bit active state Node 8-15
…	…
Node 126-120 active	8 Bit active state Node 56-63
Node 7-0 diagnostic	8 Bit diagnostic state Node 0-7
Node 15-8 diagnostic	8 Bit diagnostic state Node 8-15
…	…
Node 126-120 diagnostic	8 Bit diagnostic state Node 56-63

Table 30: Extended Diagnosis > CAN - Global state field

5.1.5 CAN - Communication Error

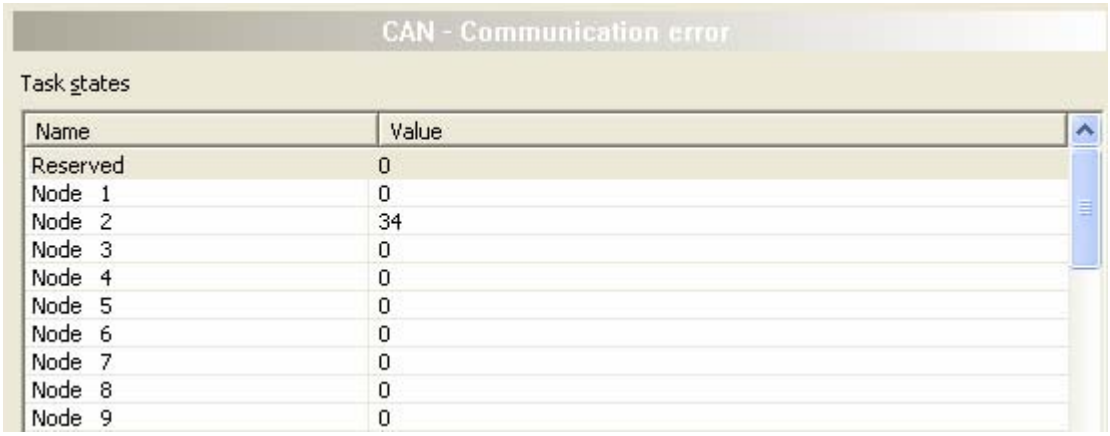


Figure 40: Extended Diagnosis > CAN - Communication error

For each Slave device the Master has an internal error status, which is displayed in this dialog window above.

5.1.6 Queues

The different received CAN specific identifiers with their message containment are assigned to different input message queues. A received message is interpreted directly after it was received by the CAN controller and stored into its corresponding queue as well as the messages that shall be sent are stored in a queue while the CAN controller is busy in sending a message. A main loop then interprets these messages and dequeues them or the interrupt handler sends the next message. The message queue handler has three parameters and their containments are shown by DTM. **bInner** is the number of actual stored messages. **bFront** is the pointer where the next message will be store and **bRear** is the pointer where the next message will be dequeued from the queue body area. In a running system the value **bInner** should normally decrease automatically to 0 and **bFront** and **bRear** should be equal.

5.1.6.1 CAN - Nodeguard inputqueue

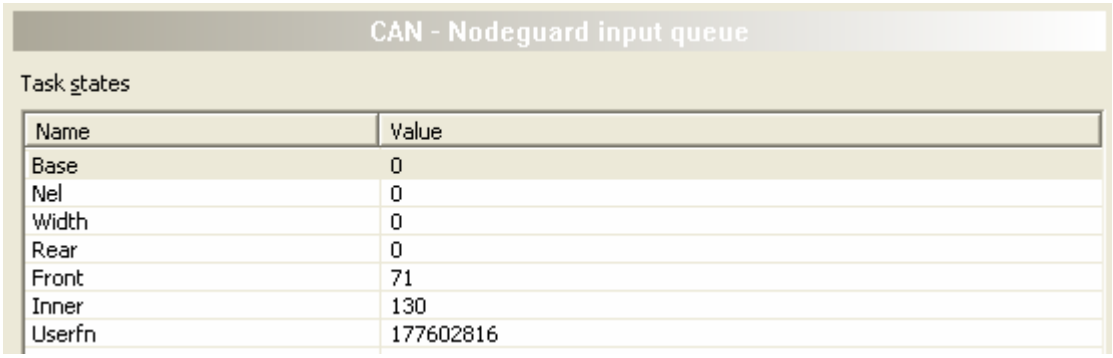


Figure 41: Extended Diagnosis > CAN - Nodeguard inputqueue

Name	Value
Base	This value serves only for development.
Nel	This value serves only for development.
Width	This value serves only for development.
bRear	Position of the next read access to the puffer of received CAN telegrams
bFront	Position of the next write access
bInner	Number of CAN telegrams which are actual included in the puffer
Userfn	This value serves only for development.

Table 31: Extended Diagnosis > CAN - Nodeguard inputqueue

5.1.6.2 CAN - Management inputqueue

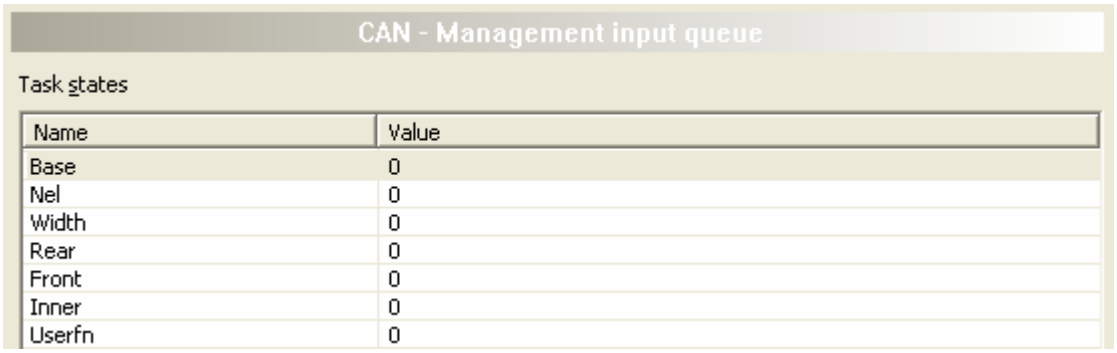


Figure 42: Extended Diagnosis > CAN - Management inputqueue

Name	Value
Base	This value serves only for development.
Nel	This value serves only for development.
Width	This value serves only for development.
bRear	Position of the next read access to the puffer of received CAN telegrams
bFront	Position of the next write access
bInner	Number of CAN telegrams which are actual included in the puffer
Userfn	This value serves only for development.

Table 32: Extended Diagnosis > CAN - Management inputqueue

5.1.6.3 CAN - Emergency inputqueue

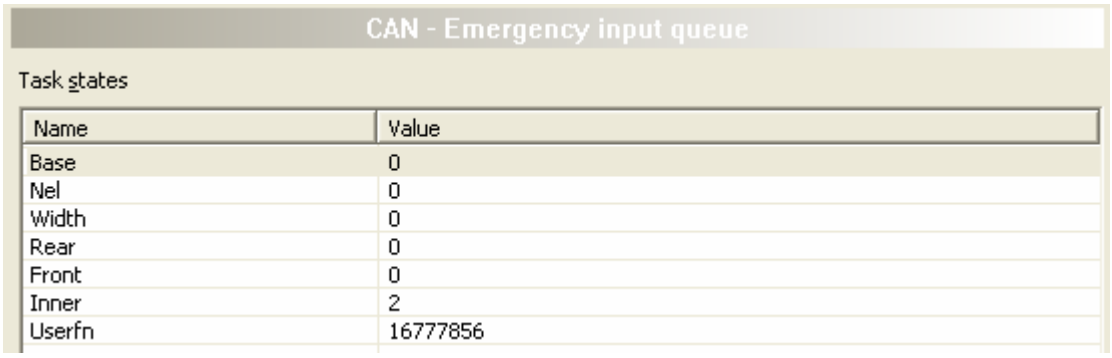


Figure 43: Extended Diagnosis > CAN - Emergency inputqueue

Name	Value
Base	This value serves only for development.
Nel	This value serves only for development.
Width	This value serves only for development.
bRear	Position of the next read access to the puffer of received CAN telegrams
bFront	Position of the next write access
bInner	Number of CAN telegrams which are actual included in the puffer
Userfn	This value serves only for development.

Table 33: Extended Diagnosis > CAN - Emergency inputqueue

5.1.6.4 CAN - Transmit inputqueue

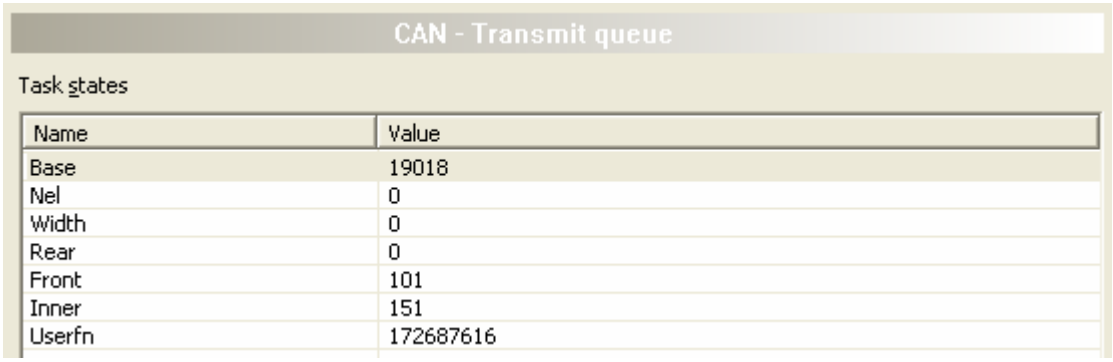
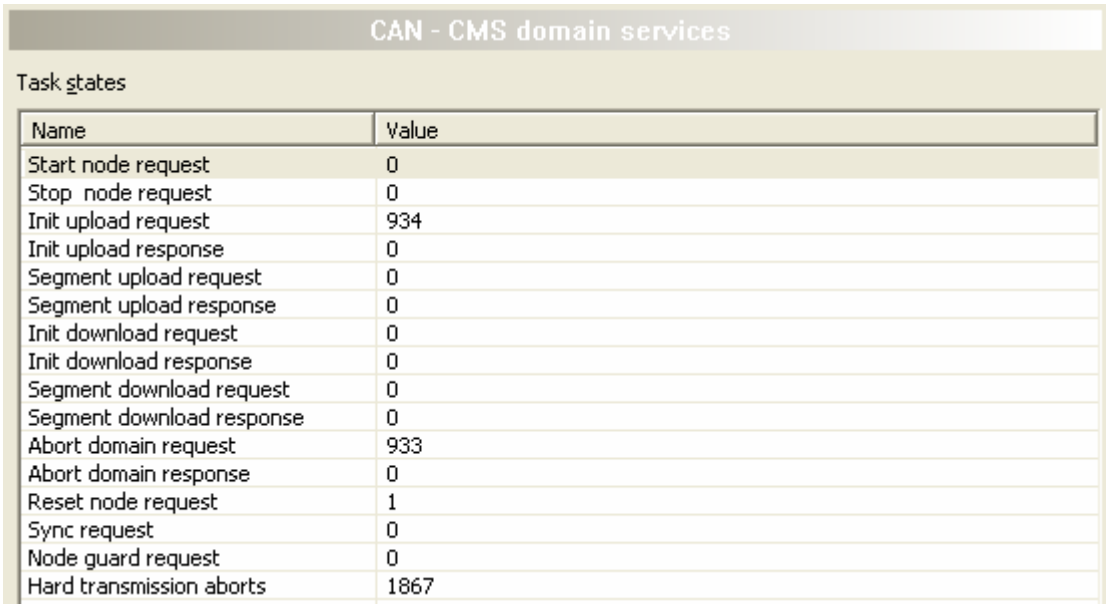


Figure 44: Extended Diagnosis > CAN - Transmit inputqueue

Name	Value
Base	This value serves only for development.
Nel	This value serves only for development.
Width	This value serves only for development.
bRear	Position of the next read access to the puffer of received CAN telegrams
bFront	Position of the next write access
bInner	Number of CAN telegrams which are actual included in the puffer
Userfn	This value serves only for development.

Table 34: Extended Diagnosis > CAN - Transmit inputqueue

5.1.7 CAN - CMS Domain Services



Name	Value
Start node request	0
Stop node request	0
Init upload request	934
Init upload response	0
Segment upload request	0
Segment upload response	0
Init download request	0
Init download response	0
Segment download request	0
Segment download response	0
Abort domain request	933
Abort domain response	0
Reset node request	1
Sync request	0
Node guard request	0
Hard transmission aborts	1867

Figure 45: Extended Diagnosis > CAN - CMS Domain Services

The CANopen protocol defines different services which are summarized under the name **Domain Services**. All Domain Services that are transmitted and were received are counted in this table and shown online by the DTM. A special value is the **Hard transmission abort** counter. Each CAN message which is inserted into the CAN controller to be sent is supervised by a simultaneously started timer. If the CAN controller cannot sent the message because it don't find any other CAN controller active in the connected network who is acknowledging him the message, the message can't be sent and the timer expires. If so the message is thrown away and the next message of the queue is inserted to be sent. So an incrementing **Hard transmission abort** counter is directly an indication for a physical hardware problem in the network. A possible fault that is often made is a wrong configured baud rate for example that causes such an error, too.

Name	Value
Start node request	Number of Service "NMT Start remote node" sent.
Stop node request	Number of Service "NMT Stop remote node" sent.
Init upload request	Number of Service "SDO Upload initiate" requests sent.
Segment upload request	Number of Service "SDO Upload segment" requests sent.
Segment upload response	Number of Service "SDO Upload segment" response received.
Init download request	Number of Service "SDO Download initiate" request sent.
Init download response	Number of Service "SDO Download initiate" response received.
Segment download request	Number of Service "SDO Download segment" requests sent.
Segment download response	Number of Service "SDO Download segment" response received.
Abort domain request	Number of Service "SDO Abort transfer" request sent.
Abort domain response	Number of Service "SDO Abort transfer" response received.
Reset node request	Number of Service "NMT Reset node" request sent
Sync request	Number of Service "SYNC Write" request sent
Node guard request	Number of Service "NMT Node guarding" request sent
Hard transmission aborts	Number of CAN message transmission aborted

Table 35: Extended Diagnosis > CMS Domain Services

6 Online to the Device

6.1 Connect/Disconnect Device

Note: For several functions e.g. diagnostic, it is necessary, that an online connection to the Master DTM exists.

- **Build up Connection**

  A connection to the device is built up via the context menu of the device.

Now the ABB Master device is online.

The connection is also necessary for several functions apart from the Diagnostic, for example for downloading the configuration. More information about the Download you find in section *Download* on page *59*.

- **Disconnect**

  If the connection to the device should be disconnected, the context menu of this device has to be called up again.

Note: For further information about building up or disconnecting a connection see the description of the frame application.

6.2 Download

A download to the Master has to be made to transfer the configuration with the corresponding parameter data.

Note: Before a download can be made, a connection to the device has to be building up. Further information about building up a connection you find in section *Connect/Disconnect* on page *59*.

If the download was successfully, the actual configuration in the application is loaded down into the Master device.

7 Error Numbers

7.1 Possible PLC Error Messages

Error Number	Description
401	driver error in the control
402	slot number is not supported by the hardware
403	no coupler at the given slot
404	control not in STOP
405	configuration data invalid
406	coupler still configured
407	answer timeout of the coupler

Table 36: Possible Control Error Messages

7.2 RCS Error Numbers

This is the list of error numbers returned by the RCS (Real-time Communication System), that is the operating system of ABB devices. The error number is returned in an answer message. Command messages and answer messages are used to communicate between the application and the ABB device. An example of this communication is the download of a configuration.

Error Number	Description
4	Task does not exist
5	Task is not initialized
6	The MCL is locked
7	The MCL rejects a send command because of an error
20	The user will download a database into the device that is not valid for this device type.
21	Data base segment not configured or not existed
22	Number for message wrong during download
23	Received number of data during download does not match to that in the command message
24	Sequence identifier wrong during download
25	Checksum after download and checksum in command message do not match
26	Write/Read access of data base segment
27	Download/Upload or erase of configured data base type is not allowed
28	The state of the data base segment indicated an error. Upload not possible
29	The access to the data base segment needs the bootstrap loader. The bootstrap loader is not present
30	Trace buffer overflow
31	Entry into trace buffer too long
37	No or wrong license. The license allows only communication to devices that have the same license inside
38	The data base created by the DTM and the data base expected by the firmware is not compatible
39	DBM module missing

Table 37: RCS error numbers (answer message) (4 .. 39)

Error Number	Description
40	No command free
41	Command unknown
42	Command mode unknown
43	Wrong parameter in the command
44	Message length does not match to the parameters of the command
45	Only a MCL does use this command to the RCS
50	FLASH occupied at the moment
51	Error deleting the FLASH
52	Error writing the FLASH
53	FLASH not configured
54	FLASH timeout error
55	Access protection error while deleting the FLASH
56	FLASH size does not match or not enough FLASH memory
60	Wrong structure type
61	Wrong length of structure
62	Structure does not exist
70	No clock on the device
80	Wrong handle for the table (table does not exist)
81	Data length does not match the structure of this table
82	The data set of this number does not exist
83	This table name does not exist
84	Table full. No more entries allowed
85	Other error from DBM
90	The device info (serial number, device number and date) does already exist
91	License code invalid
92	License code does already exist
93	All memory locations for license codes already in use

Table 38: RCS error numbers (answer message) (40 .. 93)

7.3 Database Access Error Numbers

The following table lists the error numbers of the database access errors

Error Number	Description
100	Database already opened
101	Dataset could not be opened
103	Error while opening database occurred
104	No valid path name
105	No connection to data base. Call function DbOpen().
106	Error in parameter
107	Error during opening a table
108	Null pointer occurred
109	Table not opened. Call function OpenTable() first.
110	The first record is reached
111	The last record is reached
112	Unknown type in the record found
113	Data has to be truncated
114	No access driver installed on the system
115	Exception received
116	This table is set to read only
117	There is no data set in the table
118	The requested table could not be edit
119	An operation could not be completed
120	User gives an unexpected length in WriteDs().
121	An assertion failed
122	DLL not found
123	DLL couldn't be freed
124	Specified function not found in the DLL
125	ODBC Function returns an error
126	Count of data bytes in the record exceeds 1938
127	DBM32 DLL is not loaded
128	Field with the given index was not found
129	This table contains no records
130	Invalid character (' ') found in a Table or Column

Table 39: Database Access Error Numbers (100 .. 130)

7.4 Online Data Manager Error Numbers

7.4.1 Online Data Manager Error Numbers

The following table lists the error numbers of the Online Data Manager.

Error Number	Description
1000	Driver OnlineDataManager not opened
1001	Initialization of the OnlineDataManager has failed
1002	No DriverObject found. OnlineDataManager Sub DLL not found.
1003	No DeviceObject found. Device not found.
1004	Application not found
1010	Application has requested an unknown event
1011	Application has requested an unknown function mode, operating mode. Known function modes, operating modes are Reset, Download, Register Server, Unregister Server.
1012	Application has requested an unknown command
1013	Message Server already exists
1014	Message Server not registered
1015	Device already in use
1016	Device not assigned
1017	Device has changed
1018	Command active

Table 40: Online Data Manager Error numbers (1000 .. 1018)

7.4.2 Message Handler Error Numbers

The following table lists the error numbers of the Message handler of the Online Data Manager.

Error Number	Description
2010	Message handler: Messagebuffer empty
2011	Message handler: Messagebuffer full
2021	Message handler: Invalid Message ID (msg.nr)
2022	Message handler: No entry
2023	Message handler: Message already active
2024	Message handler: Wrong Application
2025	Message handler: Message Timeout No message received. **Possible Error Cause:** Different reasons. **(1)** The selected interrupt is not free or used also from another PC component (shared interrupt). **(2)** CIF is not initialized. This is shown by an acyclic flashing RUN LED. **(3)** CIF is in bootstrap loader mode. This is indicated by a flashing RDY LED. **(4)** Another application program is accessing to the CIF the same time. **Remedy:** **(1A)** Use polling mode instead of interrupt mode. Shared interrupts are not supported from the CIF device driver under Windows 95/98/ME/NT. **(1B)** Use a free interrupt. **(2)** Download the configuration. If necessary create a new configuration. **(3)** First download the firmware and then download the configuration. **(4)** Close all other application programs that communicates to the CIF.
2026	Message handler: Wait for Delete
2027	Message handler: No cyclic Message

Table 41: Error Numbers of the Message Handler of the Online Data Manager (2010 .. 2027)

7.4.3 Driver Functions Error Numbers

The following table lists the error numbers of the Driver Functions of the Online Data Manager.

Error Number	Description
2501	OnlineDataManager Sub DLL not found
2502	Function missing
2503	'Read Thread' not created
2504	'Write Thread' not created
2505	'IO Thread' not created
2510	Function failed
2512	Assign reports error. Return neither OK or cancel

Table 42: Error Numbers of the Driver Functions of the Online Data Manager (2501 .. 2512)

7.4.4 Online Data Manager Sub functions Error Numbers

The following table lists the error numbers of the Sub functions of the Online Data Manager.

Error Number	Description
8001	Driver not opened. E.g. CIF Device Driver
8002	Application has requested an unknown event
8003	Application has requested an unknown command
8004	Command has failed
8005	Command active
8006	Device invalid
8010	No device was assigned
8011	Device was already assigned
8020	Driver not connected
8021	Driver already connected
8030	Faulty 'GetState'
8031	Send error (PutMessage returns error)
8032	Send active (PutMessage active)
8033	Receive error (GetMessage returns error)
8034	Receive active (GetMessage active)
8035	IO Error (ExchangeIO returns error)

Table 43: Sub function Error Numbers of the Driver Functions of the Online Data Manager (8001 .. 8035)

7.5 Data Base Functions Error Numbers

The following table lists the error numbers of the converting functions.

Error Number	Description
4000	File does not exist
4001	Success in compromising
4002	Dataset does not exist
4003	Last respectively first entry reached
4004	Not enough memory
4005	File directory full
4006	Max number of entries reached
4007	No writing to this table possible, because the table is located in the FLASH
4008	Table name does already exist
4009	File name does not exist
4010	Free RAM length from RCS_CNF.P86 is smaller than E_F_INDEX * 2
4011	Parameter ‘next’ wrong
4012	Not enough free space to copy data set
4013	Set is deleted
4014	Value for Index is wrong
4015	Access not allowed
4016	open_file used before init_file
4017	Drive is not ready
4018	Not enough drive memory
4019	File name or path does not exist
4020	Cannot create path
4021	Wrong path
4022	Wrong flag
4023	The delete path is the root path
4024	Path file exists
4025	Write error during write a file
4026	Error during create a file
4027	Error during close a file
4028	No DBM file
4029	Length of the read data is unequal of the file length

Table 44: Error numbers of converting functions (4000 .. 4029)

Error Number	Description
4030	Path too long
4031	Directory changed
4032	Directory created
4034	Length of converting stream is 0
4035	Non equal data set found
4036	Non equal data set found
4037	Non equal data set found
4038	Data set has length 0
4039	The function DbmInit has assigned a Zero pointer during RCS initialization
4040	Printer not ready
4041	The data base is used from another function
4042	New length of data base is smaller than used
4043	Unknown access mode
4044	Old data base has to be converted
4045	Error while converting. Function not known
4046	Unknown type in set 0 found
4047	No float function available
4048	Function not in RCS module
4049	Check failed
4050	Checksum check failed
4051	More segments are existing in file, than in the structure FILE_INFO_T in wMaxEntries
4052	SegLen in structure FILE_INFO_T is smaller then the length in the file. Return of function dbm_restore_data
4053	The header file holds an other information for a length than in the segment itself
4054	Not enough memory for allocation on the PC
4055	No index for file handle in structure FLASH_DIR of RCS found
4057	File type 2 can not be printed because of too many definitions
4058	The definitions need too many lines to display them, than in the program available
4059	An unknown format for the parameter. Valid is U, H, or S
4060	Unknown parameter type

Table 45: Error numbers of converting functions (4030 .. 4060)

Error Number	Description
4061	The data base was transmitted into the FLASH
4062	Set 0 contains no structure definition
4063	Set 0 can not be deleted
4064	Error during execution of a ODBC data base access
4065	Initialization of DBM through RCS had no success
4066	Passed data length incorrect
4067	Sorting function not linked
4068	Error in function parameter
4069	Error from ODBC table
4070	No free handle available. Too many data base links are already opened
4071	Unknown data type found in the table
4072	Structure of table GLOBAL not correct or no such table existing
4073	No name of an ACCESS data base
4074	Download window can’t be created
4075	Download not fully performable

Table 46: Error numbers of converting functions (4061 .. 4075)

Error Number	Description
4082	More than 32 tables should be created
4083	No entry in element szSourceFile
4084	ODBC connection initialization not possible. This could happen when in file ODBCINST.INI in section [Microsoft Access Driver (*.mdb)] is no valid path to ODBCJT16/32.DLL.
4085	Error in structure in the ACCESS data base that is in DBM format
4086	Error in structure in the ACCESS data base that is in DBM format
4087	No data in a ODBC table
4088	No entry
4089	ODBC set length not valid
4090	Not enough data sets in ODBC table
4091	Table Create Tab not found
4092	Error in structure of table CreateTab
4093	No entry in element szSourceTable
4094	No entry in element szDestTable
4095	Entry in iSourceType of table CreateTab is wrong
4096	Entry in iTranslate of table CreateTab is wrong
4097	Function SQLAllocStmt reports an error
4098	ODBC source table not found
4099	ODBC data truncated
4100	Download timeout
4101	Library load error
4102	Library function error
4103	Error in description 'toggle'
4104	Error in description 'KB'
4105	Column does not exist
4106	ODBC structure different
4107	ODBC address error
4108	No CRC sum exists (table GLOBAL exists or old)
4109	Table GLOBAL is old
4110	Calculated CRC different to CRC in table GLOBAL
4199	Programming error

Table 47: Error numbers of converting functions (4082 .. 4199)

7.6 Converting Functions Error Numbers

The following table lists the error numbers of converting functions.

Error Number	Description
5000	Function PackLongToByteShort: Not enough space in pvD (Number of elements greater than reserved memory)
5001	Function PackLongToByteShort: Not enough space in pvD. Detected during converting of pvS
5002	Function PackLongToByteShort: Not enough space in pvD
5003	Function StringToByte: Not enough space in pvD
5004	Function IntToByte: Not enough space in pvD
5005	Function LongToShort: Not enough space in pvD
5006	Function PackStringDumpToByteArray: Not enough space in pvD
5007	Function PackStringBumpToByteArray: A character was found, which is not convertible into a HEX value
5008	Function PackStringDumpToByteArray: Number of character odd
5009	Function PackStringDumpToByteArray: Not enough space in pvD
5010	Function PackStringDumpToByteArray: The current data set needs to be appended the previous one
5011	Function PackStringDumpToByteArray: No corresponding function to the given number exist
5012	Converting error

Table 48: Error Numbers of data base functions (5000 .. 5012)

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9 Glossary

DTM

Device Type Manager

The Device Type Manager (DTM) is a software module with graphical user interface for the configuration and/or for diagnosis of devices.

FDT

Field Device Tool

FDT specifies an interface, in order to be able to use DTM (Device Type Manager) in different applications of different manufacturers.

MAC ID

The network address of a device serves to distinguish itself on a XXX fieldbus system from any other device or Slave on this network. This should be a unique number for each device. A valid MAC-ID address is within a range of 0 to 63 and can be re-entered and changed in the MAC-ID box in the Device Configuration Dialog.

Master

Master devices initiate the data exchange at the bus.

Slave

Slave devices are configured by the Master and perform then the communication.

Operating Instruction Manual

Generic DTM for CANopen Slave Devices

Configuration of CANopen Slave Devices

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ABB STOTZ-KONTAKT GmbH
Eppelheimer Straße 82
D-69123 Heidelberg
Germany

Tel.: +49 (0) 6221/701-0

Hotline Tel.: +49 (0) 6221/701-1444
Hotline Fax: +49 (0) 6221/701-1382

Email Hotline: Desst.helpline@de.abb.com

Web: www.abb.de/sto

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Although this program has been developed with great care and intensively tested, ABB STOTZ-KONTAKT GmbH cannot guarantee the suitability of this program for any purpose not confirmed by us in writing.

Guarantee claims shall be limited to the right to require rectification. Liability for any damages which may have arisen from the use of this program or its documentation shall be limited to cases of intent.

We reserve the right to modify our products and their specifications at any time in as far as this contribute to technical progress. The version of the manual supplied with the program applies.

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1 Introduction

1.1 About CANopen Generic Slave DTM

This manual describes how to set up CANopen devices, which are described with EDS files. The configuration is made with FDT Frameworks.

If you use such a device in your configuration, you will find a description about the single device parameters and configuration possibilities in this manual. The presentation is universal, but manufacturer-specific characteristics are possible.

1.2 Requirements

Requirements for working with a CANopen Generic Slave DTM are:

- Installed FDT Framework
- Installed CANopen Master DTM
- Open Project
- DTM need to be loaded in the Device Catalog

Loading EDS Files

To work with the Slave DTM, the EDS file of the device has to be copied into the EDS folder in the installation directory of the Generic DTM.

Now the Device Catalog has to be reloaded to make the devices available in the FDT Framework.

1.3 Dialog Structure of the CANopen Generic Slave DTM

The dialog window of the DTM is divided in three different areas:

- A header which contains the **General Device Information**.
- The **Pages Tree-View**.
- The **Configuration, Device Description and Diagnosis Pages**.

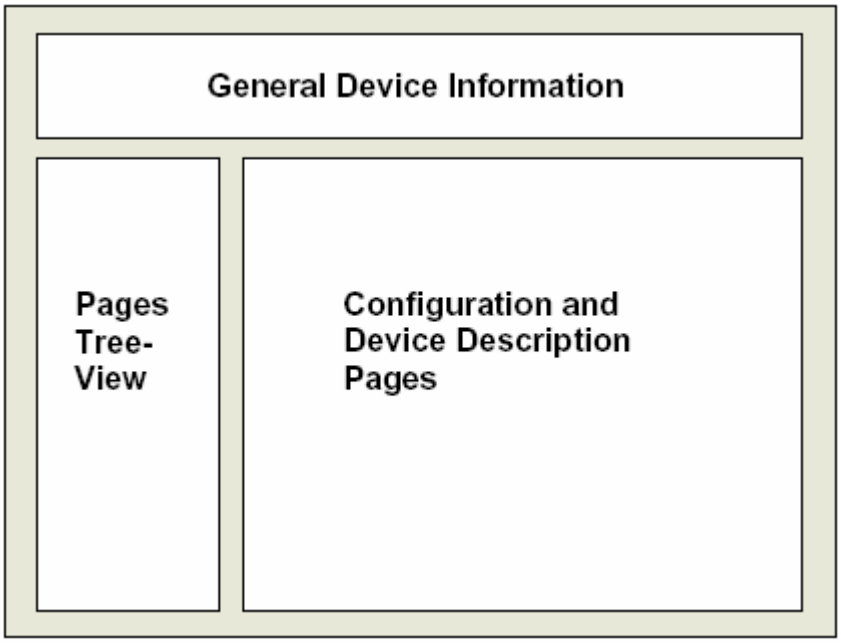


Figure 1: Dialog Structure of CANopen Generic Slave DTM

1.3.1 General Device Information

The general device information contains information about the configured device. This indication is only for information and can not be edited.

The indicated information is **IO Device** (name of the device), the **Vendor**, the **Device ID** and the **Vendor ID**.

Figure 2: General Device Information

1.3.2 Pages Tree-View

The left side of the Generic Slave DTM shows the device configuration as Pages Tree-View:

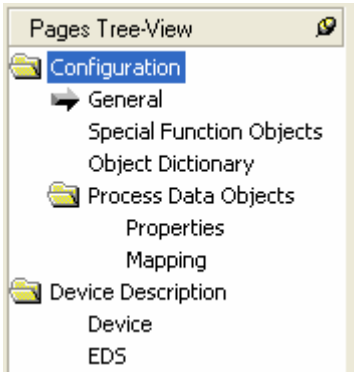


Figure 3: Pages Tree-View Configuration and Device Description

Configuration	
General	The dialog **General Settings** displays EDS file data. For further information see section *General Settings* on page *14*.
Special Function Objects	The dialog **Special Function Objects** displays data of the synchronization, time stamp and emergency telegram. For further information see section *Special Function Objects* on page *15*.
Object Dictionary	The dialog **Object Dictionary** represents the object dictionary of the device. The display shows data read out from the EDS file. For further information see section *Object Dictionary* on page *17*.
Process Data Objects	
PDO Properties	In the dialog **PDO Properties** the transmit and the receive PDOs are displayed. For further information see section *PDO Properties* on page 20.
PDO Mapping	The dialog **PDO Mapping** permits to map the contents of a PDO. For further information see section *PDO Mapping* on page *23*.
Device Description	
Device	The **Device Info** page contains the manufacturer information about the device. For further information see section *Device Info* on page *23.*
EDS	By use of the **EDS-Viewer** an EDS file can be viewed and searched through. For further information see section *EDS Viewer* on page *27.*

Table 1: Overview Configuration and Device Description Pages

1.4 Configuration and Device Description Pages

On the configuration and device description pages the device specific settings and the configuration can be made. These one can be edited by entering parameter values or selected via pull-down menus.

Detailed information to the single pages you can find below in this manual. Subsequently the sections with the descriptions to the single configuration and device description pages for the ABB CANopen Master DTM are listed.

Configuration

Contents	Page
General Settings	*14*
Special Function Objects	*15*
Object Dictionary	*17*
Process Data Objects	*20*
PDO Properties	*20*
PDO Mapping	*23*

Table 2: Configuration Pages

Device Description

Contents	Page
Device Info	*23*
EDS Viewer	*27*

Table 3: Device Description Pages

1.5 Status Bar

The Status Bar displays information about the current state of the DTM. The meaning of the icons is explained in the following:

Figure 4: Status Bar

Number	Meaning	
1	Name of the Master DTM manufacturer: ABB STOTZ-KONTAKT GmbH	
2	Connection State Icon closed = Device is online Icon not closed = Device is offline	
3	Offline data: The displayed data are read out from the configuration file (database).	
	Online data: The displayed data are read out online from the device.	
4	Configuration was changed This symbol indicates, that the configuration was changed and these changes have not been saved until yet. When saving the actual configuration, this symbol expires.	
5	Diagnosis is activated	
6	The status of the device is displayed first as icon (6) and below it is indicated in plain text (7). The following states can appear:	
	Info	
	Warning	
	Error	

Table 4: Elements of the Status Bar

1.6 Dialog Buttons

OK

If it is confirmed with **OK**, the settings are stored and the dialog is closed.

Cancel

Clicking the **Cancel** button it is asked to confirm the loss of all modifications made before. If changes at the configuration were made, a safety inquiry follows whether the changes are to be stored or not. Subsequently, the dialog is closed.

Apply

The modifications are stored temporary to the frame applications database when clicking the **Apply** button. The dialog remains opened.

Reset

By means of the **Reset** button changes in the configuration of the frame application are rejected.

EDS Default Values

By clicking on the **EDS Default Values** button, the changes made by the user are cleared and the values are reset to the default values defined in the EDS file.

Help

For the configuration and diagnosis of the DTM a help file is available. This is opened by clicking the **Help** button.

Selecting or deleting Table Line

To select a line in a table or to create a new one or to delete one the available arrow buttons can be used.

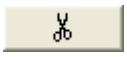
Button	Meaning
	To select the table's first line use the button **First Line**.
	To select the previous line in the table use the button **Previous Line**.
	To select the next line in the table use the button **Next Line**.
	To select the last line in the table use the button **Last Line**.
	The button **Delete selected Line** deletes the selected line from the table.

Table 5: Meaning of the Buttons selecting, creating, deleting Table Line

Activating / Deactivating Options

To activate an option set a hook into the checkbox.

To deactivate an option remove the hook from the checkbox.

☐ Activated / ☑ deactivated

2 Configuration

2.1 Overview Configuration

Pages Tree-View **Configuration** for the CANopen Generic Slave DTM:

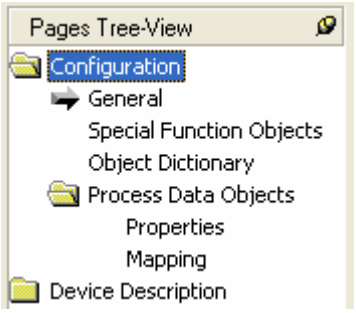


Figure 5: Pages Tree-View - Configuration

Descriptions to the configuration pages for the CANopen Generic Slave DTM:

Contents	Page
General Settings	*14*
Special Function Objects	*15*
Object Dictionary	*17*
Process Data Objects	*20*
PDO Properties	*20*
PDO Mapping	*23*

Table 6: Configuration Pages

2.2 General Settings

The dialog **General Settings** displays EDS file data:

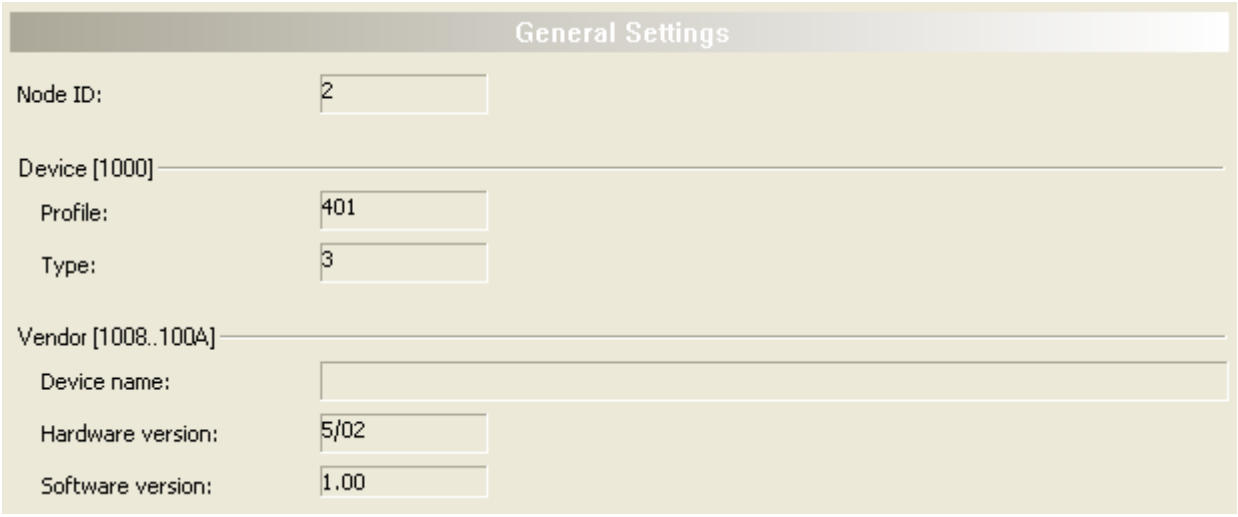


Figure 6: General Settings

Parameter	Meaning	Range of Values / Value
Node ID	The **Node ID (address)** is required to address the device at the bus and must be unique within the CANopen network. Therefore it is not allowed to use this number twice in the same network and must match with the set Node address of the device. Otherwise it is not possible for the Master to build up a communication to this device.	1 … 127
Device Profile and Device Type	Because of the information of the **Device Profile** and the **Device Type** during start of communication, the Master can read out the Object 1000H from the Node and compare it with these data. Each CANopen Node has a mandatory Object 1000H, which must be present in the object directory. This object is named **Device Type**. The **Device Type** also includes the information about the **Device Profile**. The Master reads out the Object 1000H from the Node when starting up the CANopen bus and compares the entries, which are made in the two available fields **Device Profile** and **Device Type**. If the **Device Profile** and the **Device Type** do not comply, the Master reports a parameterization error and does not establish a process data transfer to the Node. The examination can be also deactivated.	Value read out from the EDS file
Device Name, Hard and Software Version	Displayed manufacturer data read out from the EDS file.	Value read out from the EDS file

Table 7: General Settings

2.3 Special Function Objects

The dialogue **Special Function Objects** displays data of the synchronization, time stamp and emergency telegram, which are adjusted in the Master DTM and can not be edited here. These parameters can be changed via the CANopen Master DTM.

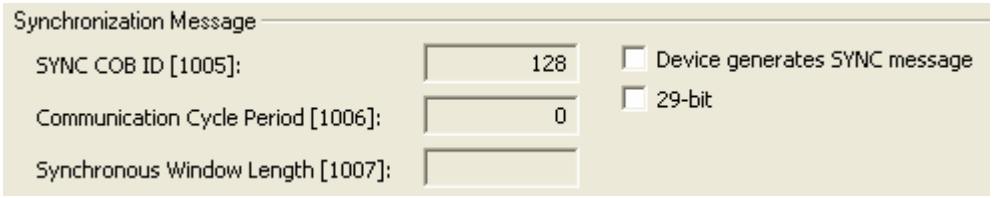


Figure 7: Special Function Objects - Synchronization Telegram

Parameter	Meaning
Synchroni-zation Message	A PDO in CANopen can be configured in Event Driven mode or Cyclic Transmission. Both kinds of transmission types can be synchronized to a special **synchronization message** which is sent by the master in defined time intervals.
SYNC COB-ID [1005]	The **SYNC COB-ID** is assigned by the master and cannot be edited here. It can be changed only by the CANopen Master DTM. The **SYNC COB ID** specifies the Identifier of the synchronization telegram. If the communication cycle period is not equal to zero, the transmission of the SYNC telegram is activated.
Communi-cation Cycle Period [1006]	The **Communication Cycle Period** is assigned by the Master and cannot be edited here. It can be changed only by the CANopen Master DTM. The **Communication Cycle Period** specifies the time for the interval for the transmission the SYNC telegram.
Synchronous Window Length [1007]	The **Synchronous Window Length** is assigned by the master and cannot be edited here. It can be changed only by the CANopen Master DTM. The **Synchronous Window Length** specifies the length of the time window for synchronous PDO (process data objects).

Table 8: Special Function Objects - Synchronization Telegram

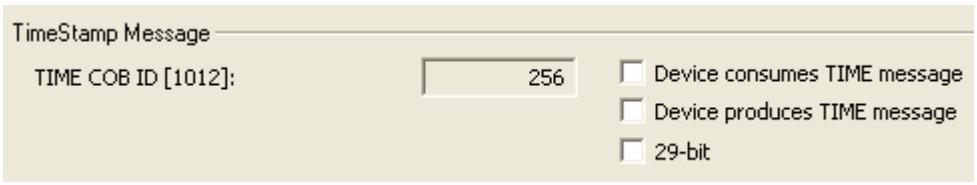


Figure 8: Special Function Objects - Time Stamp Message

Parameter	Meaning
Time Stamp Message	For transmission of time data.
TIME COB-ID [1012]	The **TIME COB ID** is assigned by the Master and cannot be edited here. It can be changed only by the CANopen Master DTM. The **TIME COB ID** specifies the COB ID of the time stamp object. If the field **Device consumes TIME message** is marked, the device consumes the time stamp message. If the field **Device produces TIME message** is marked, the device produces the time stamp message. If the field is **29-bit** is marked, the 29-bit CAN ID of the CAN ID extended frame is valid.

Table 9: Special Function Objects - Time Stamp Message

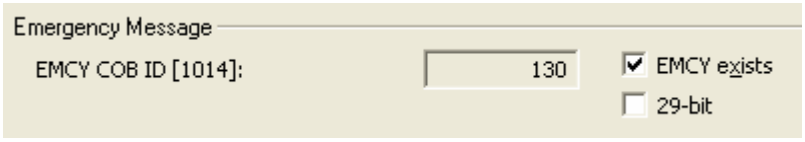


Figure 9: Special Function Objects - Emergency Message

Parameter	Meaning
Emergency-Telegram	Emergency telegrams are sent by the Node when a node internal event occurs. The CANopen Master can buffer maximally 5 Emergency telegrams.
EMCY COB-ID [1014]	If **EMCY COB ID** is activated, the CANopen Master can receive EMCY (Emergency) telegrams. The **EMCY COB ID** is assigned by the Master and cannot be edited here. It can be changed only by the CANopen Master DTM. The **EMCY COB ID** specifies the COB ID of the Emergency telegram. If the field is **29-bit** is marked, the 29-bit CAN ID of the CAN ID extended frame is valid.

Table 10: Special Function Objects - Emergency Message

2.4 Object Dictionary

The dialog **Object Dictionary** represents the object dictionary of the device. The display shows data read out from the EDS file.

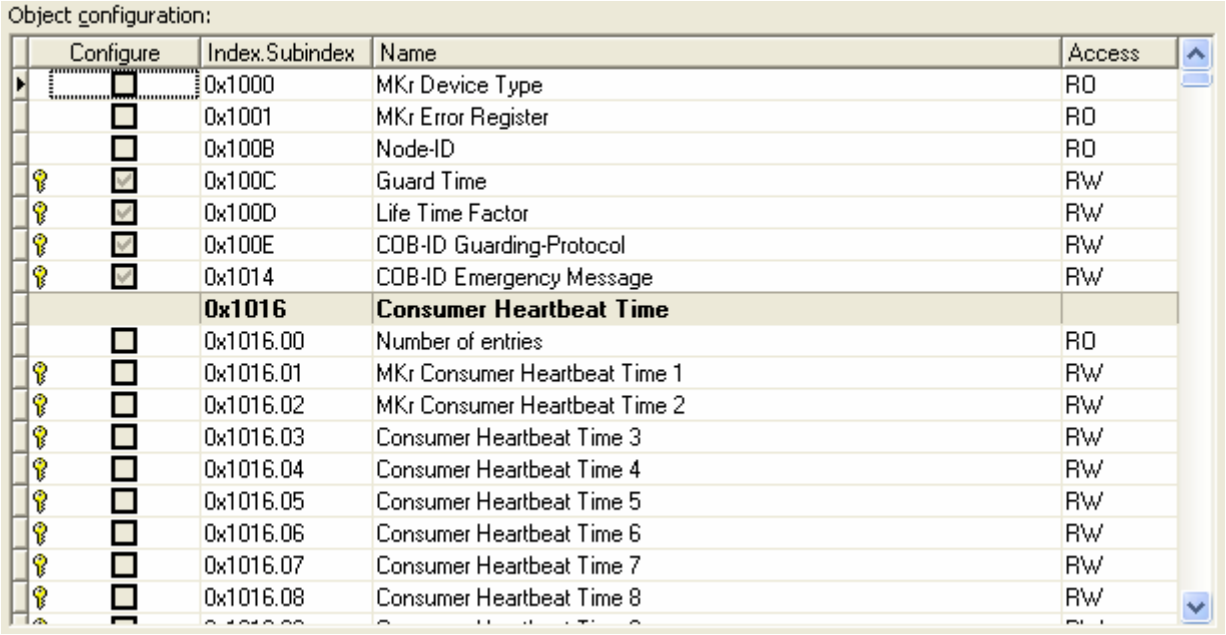
By means of filters in the table **Object Configuration** lists with configured and/or not configured objects can be displayed. A search function allows searching for a special object within the lists.

Figure 10: Object Dictionary - Filter Object Configuration

Parameter	Meaning	Range of Values / Value
Area	Via **Area** a filtered object dictionary area can be selected, which is displayed in the table **Object Configuration**. If **All** is selected, in the table **Object Configuration** all objects are displayed, which are defined in the EDS file.	**All** 0x1000 … 0x11FF 0x1200 … 0x 13FF 0x1400 … 0x1FFF 0x2000 … 0x5FFF 0x6000 … 0x9FFF 0xA000 … 0xFFFF
Status	Via **Status** it is possible to specify whether in the table **Object Configuration** all objects, only the configured objects or only the not configured objects of the selected range are to be displayed. Only the objects configured are relevant for data exchange.	**All** configured not configured
Object	In the searching field **Object** the object index and/or the object index and subindex of a certain object can be entered. If the arrow button **-> Go** is clicked, the searched object (if available) is displayed in the upper line of the table **Object Configuration**. To enter an object index with subindex a dot is used. Example: 1400.01	Min: 0000 Max: FFFF

Table 11: Object Dictionary - Filter Object Configuration

The objects read out from the EDS file are displayed in the table **Object Configuration**. For better readability for objects with subindex a heading (object index without subindex) is displayed.


Object configuration:

Configure	Index.Subindex	Name	Access
☐	0x1000	MKr Device Type	RO
☐	0x1001	MKr Error Register	RO
☐	0x100B	Node-ID	RO
☑	0x100C	Guard Time	RW
☑	0x100D	Life Time Factor	RW
☑	0x100E	COB-ID Guarding-Protocol	RW
☑	0x1014	COB-ID Emergency Message	RW
	0x1016	**Consumer Heartbeat Time**	
☐	0x1016.00	Number of entries	RO
☐	0x1016.01	MKr Consumer Heartbeat Time 1	RW
☐	0x1016.02	MKr Consumer Heartbeat Time 2	RW
☐	0x1016.03	Consumer Heartbeat Time 3	RW
☐	0x1016.04	Consumer Heartbeat Time 4	RW
☐	0x1016.05	Consumer Heartbeat Time 5	RW
☐	0x1016.06	Consumer Heartbeat Time 6	RW
☐	0x1016.07	Consumer Heartbeat Time 7	RW
☐	0x1016.08	Consumer Heartbeat Time 8	RW

Figure 11: Object Dictionary - Object Configuration

Parameter	Meaning	Range of Values / Value
Configure	In the table **Object Configuration** the activated PDOs in the associated check box **Activating** are marked with a hook. The check boxes of the PDOs which are not configured are not marked.	activated deactivated
Index.Subindex	All objects are addressed in the object index and the corresponding subindex, which are defined by the EDS file.	Object index 0x1000 … 0xFFFF Sub index 0x00 … 0xFF
Name	Symbolic name of the object, which is defined by the EDS file.	From EDS file
Access	Gives the access right of the object, which is defined by the EDS file.	RO = read only (read) RW = read, write (read, write) WO = write only (write)

Table 12: Object Dictionary - Object Configuration

If in the table **Object Configuration** a line is clicked by the cursor, the selected object, the current value, the default value, the data type, the minimum and maximum value are displayed in the fields below the table. By **Display mode** data display can be chosen in decimal or in hexadecimal mode.

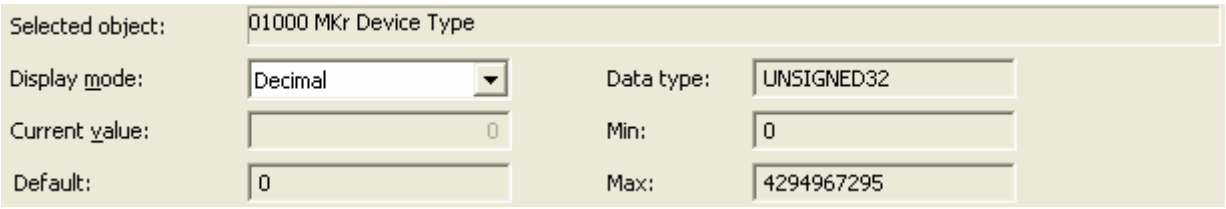


Figure 12: Object Dictionary - Data selected Object

Parameter	Meaning	Range of Value
Selected Object	In the display field **Selected Object** the object index, the subindex and the name of the selected object are indicated. These data are defined by the EDS file.	
Display Mode	By selection of the **Display Mode** decimal and/or hexadecimal from the list field the values are displayed in decimal and/or hexadecimal mode.	**Hexadecimal** Decimal
Current Value	In the input field **Current Value** a value can be assigned to the selected object.	
Default, Data Type, Min/Max	In the display fields **Default, Data Type** and/or **Min/Max** the default value defined in the EDS file, the data type and/or the minimum and maximum value for the object is indicated. The values **Min.** and **Max.** are displayed in decimal mode by default.	

Table 13: Object Dictionary - Data selected Object

2.5 Process Data Objects

2.5.1 PDO Properties

In the dialog **PDO Properties** the transmit and the receive PDOs are displayed. By the list field **PDO Type** the display can be changed from transmit PDOs (TPDO) to receive PDOs (RPDO) and vice versa.

Figure 13: Process Data Objects > PDO Properties - PDO Type

The PDOs supported by the node are read out of the EDS file and displayed in the table **PDO Configuration**. The PDOs to be used for the communication can be specified i.e. configured in this window.

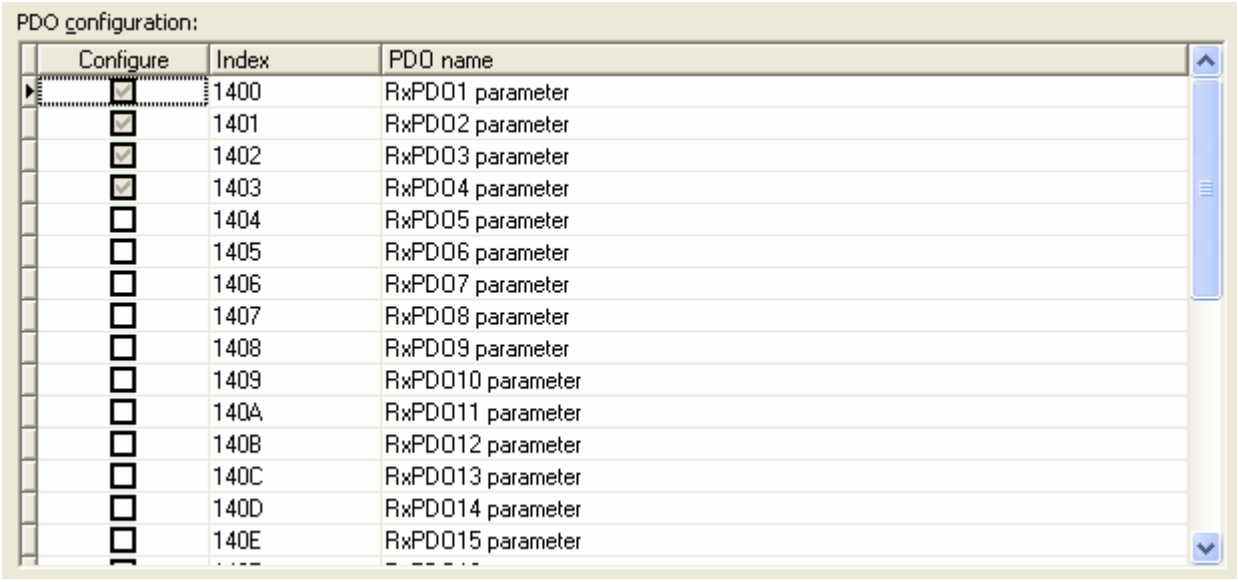


Figure 14: Process Data Objects > PDO Properties - PDO Configuration

Parameter	Meaning	Range of Values / Value
PDO Type	Filter function for the table **PDO Configuration** as - Transmit PDOs - **TPDO** = Transmit PDO or as - Receive PDOs - **RPDO** = Receive PDO. Transmit PDOs are sent by the node and are input data of the Master. Receive PDOs are output data of the Master and are received from the node.	TPDO RPDO
Configure	By activating/configuring of a PDO the PDO is used for the communication. The corresponding parameter values are part of the master configuration. During initialization the master transfers these parameters automatically into the node (default behavior). ***Note:*** *The transmission of the parameters during the initialization phase can also be deactivated and/or become deactivated. I.e., the node uses parameters, which can be different from the parameters set here.*	configured not configured
Index	Object Index of the Process data object (PDO)	0x1400 … 0x15FF 0x1800 … 0x19FF
PDO Name	Here RxPDO name and/or TxPDO name is indicated. These are defined in the EDS file.	

Table 14: Process Data Objects > PDO Properties - PDO Configuration (examine)

Each process data object (PDO) has characteristics. These are displayed below the table.

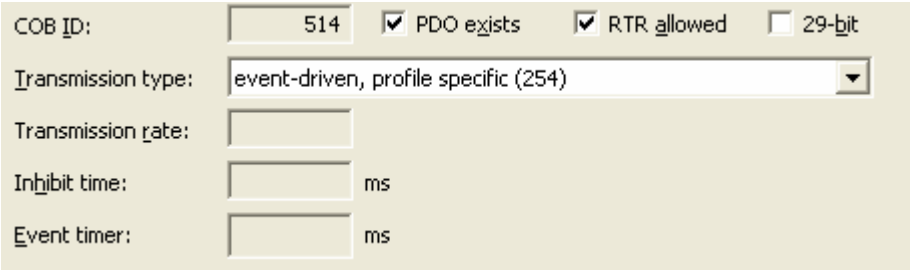


Figure 15: Process Data Objects > PDO Properties - Data selected Object

Parameter	Meaning	Range of Values / Value
COB-ID	In this field the CAN telegram identifier is displayed.	0 … 2047
Transmission Type	For the transmit and/or receive PDOs different transmission types are possible. For a PDO in CANopen event driven, synchronous or asynchronous transmission can be configured. Transmission types can be synchronized to the synchronization message SYNC for example, which is sent by the master in defined time intervals. Synchronous means that the transmission of the PDO is related to the SYNC message. Asynchronous means that the transmission of the PDO is not related to the SYNC message and can be done at any time. ***Note:*** *The support of the different transmission types is manufacturer and device dependent. For CANopen the support of individual and/or all transmission types is not required. Whether a device supports the desired transmission type, must be reread and/or examined in the technical manual of the used device, if necessary.*	0 … 255 synchronous acyclic (0) synchronous cyclic (1-240) synchronous RTR (252) asynchronous RTR (253) Event driven, profile specific (254) Event driven, manufacturer specific (255)
Transmission Factor	For synchronous TPDOs for the transmission type **synchronous cyclic (1-240)** another factor is to be set, to which SYNC telegram the data transmission refers. A transmission factor of 1 means that the message will be transferred with each SYNC telegram. A transmission factor of n means that the message will be transferred with each n-th SYNC telegram. Asynchronous TPDOs are not transferred in a temporal correlation with a SYNC.	
Inhibit Time	The **Inhibit Timer** (if supported) describes the time interval, which at least must be waited between the transmissions of two equal telegrams. Thus a too frequent transmission of the same telegram is suppressed.	
Event Timer	The **Event Timer** (if supported) is possible only for TPDO transmission types 254 and 255. The expiration of the timer is used in the node as event, in order to send the TPDO. Manufacturer and/or device-specifically also an application event can activate the sending of the TPDOs and reset the **Event Timer**.	TPDO 254, 255

Table 15: Process Data Objects > PDO Properties - Data selected Object

2.5.2 PDO Mapping

The dialog **PDO Mapping** permits to map the contents of a PDO.

By use of the **Filter PDO type** field in the table **Mappable Objects** the receive PDOs (RPDO) or alternatively the transmit PDOs (TPDO) can be displayed.

Figure 16: Process Data Objects > PDO Mapping - Filter PDO Type

In the list field **Object Dictionary Area** an object dictionary area can be preselected.

Figure 17: Process Data Objects > PDO Mapping - Object Dictionary Area

The mappable objects appropriate to the preselection are listed in the table **Mappable Objects**.

Mappable objects:

Index.Subindex	Parameter	Length	Access
02200	**Digital Byte Outputs**		
02200.01	Output Byte 1	8	WO
02200.02	Output Byte 2	8	WO
02200.03	Output Byte 3	8	WO
02200.04	Output Byte 4	8	WO
02200.05	Output Byte 5	8	WO
02200.06	Output Byte 6	8	WO
02200.07	Output Byte 7	8	WO

Figure 18: Process Data Objects > PDO Mapping - Mappable Objects

Parameter	Meaning	Range of Value
Object Dictionary Area	Object dictionary filter range.	**All** 0x1000 … 0x11FF 0x1200 … 0x 13FF 0x1400 … 0x1FFF 0x2000 … 0x5FFF 0x6000 … 0x9FFF 0xA000 … 0xFFFF
Mappable Objects	List of the mappable objects.	from EDS file
Index. Subindex	All objects are addressed in the object index and if necessary in the corresponding subindexes, which are defined by the EDS file.	0x1000 … 0xFFFF as well as 0 … 0xFF
Parameter	Name of the object from the EDS file.	from EDS file
Length	The length of the PDOs in bytes.	
Access	Gives the access rights of the process data objects, which are defined by the EDS file.	rw = read, write

Table 16: Process Data Objects > PDO Mapping - Mappable Objects

In the list field **PDO Contents Mapping for** the PDO is selected, the PDO contents to be displayed.

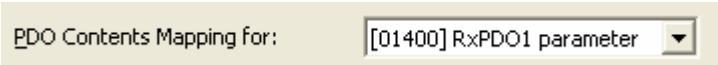


Figure 19: Process Data Objects > PDO Mapping - Filter Mapped Objects

The mapped objects appropriate to the preselection are listed in the table **Mapped Objects**.

Mapped objects:

Index	Subindex	Parameter	Length
02200	01	Output Byte 1	8
02200	02	Output Byte 2	8
02200	03	Output Byte 3	8
02200	04	Output Byte 4	8
02200	05	Output Byte 5	8
02200	06	Output Byte 6	8
02200	07	Output Byte 7	8
02200	08	Output Byte 8	8

Figure 20: Process Data Objects > PDO Mapping - Mapped Objects

Parameter	Meaning	Range of Value
PDO Contents Mapping for	The PDO list field **PDO Contents Mapping for** contains all configured PDOs of the page PDO Properties. The objects responsible for data exchange (max. 8 byte/PDO) are assigned to the PDOs.	
Filter PDO Type	The mapping is proceeded separately for the RPDOs and/or the TPDOs.	RPDO TPDO
Mapped Objects	The table **Mapped Objects** contains only configured objects and always corresponds in the PDO list field **PDO Contents Mapping for** selected PDOs.	
Index. Subindex	All objects are addressed in the object index and if necessary in the corresponding subindexes, which are defined by the EDS file.	0x1000 … 0xFFFF as well as 0 … 0xFF
Parameter	Name of the parameter from the EDS file.	from EDS file
Length	The Length specifies the length of the PDOs.	

Table 17: Process Data Objects > PDO Mapping - Mapped Objects

To change the object sequence in the table **Mapped Objects** more easily, shifting buttons are available: move completely above, above, down and completely down.

3 Device Description

3.1 Overview Device Description

Pages Tree-View **Device Description** for the PROFIBUS Generic Slave DTM:

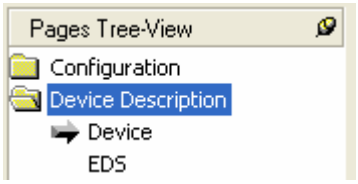


Figure 21: Pages Tree-View - Device Description

The folder **Device Description** contains the device information and an EDS Viewer.

Descriptions to the configuration pages for the PROFIBUS Generic Slave DTM:

Contents	Page
Device Info	23
EDS Viewer	27

Table 18: Device Description Pages

3.2 Device Info

The **Device Info** dialog contains manufacturer information about the device, which is defined in the EDS file. The following information is indicated:

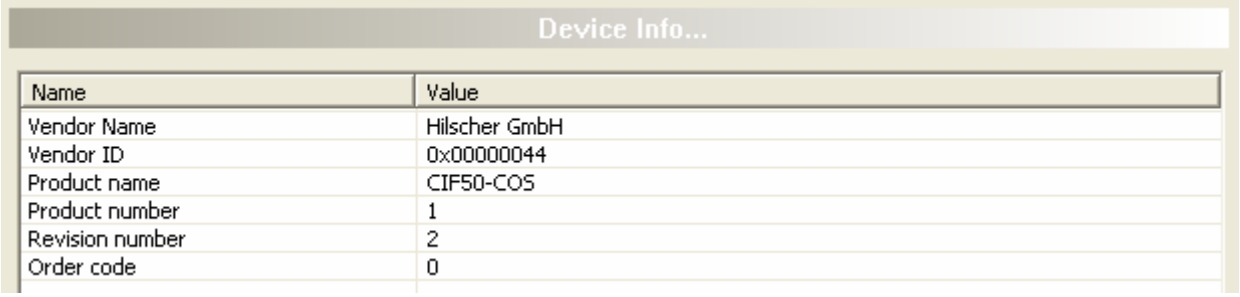


Figure 22: Device Description - Device

3.3 EDS Viewer

The **EDS Viewer** shows the content of the EDS file in a text view.

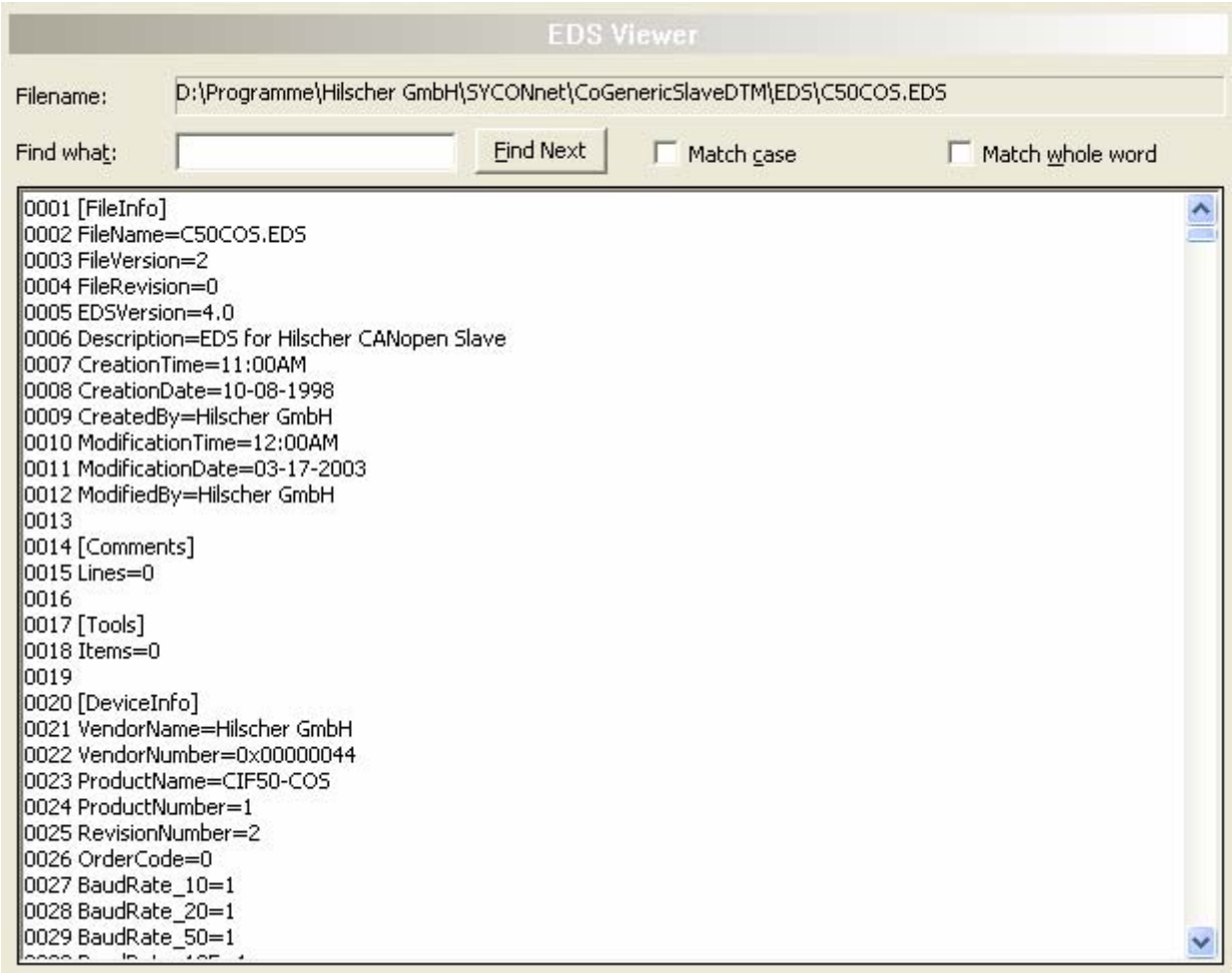


Figure 23: Device Description - EDS

On the left side, the line number is displayed for simple overview, the further entries show the EDS file in text format.

Furthermore under **Filename** the file directory path and the file name of the EDS file is displayed. **Find what** offers a search feature to search for text contents within the text of the EDS file.

4 Appendix

4.1 COB-ID (Predefined Connection Set)

COB ID stands for communication object identifier. This is the 11 bit covering telegram identifier of a CAN telegram. Thereby the upper 4 bits (bit 11 to 8) are the function identifier and the lower 7 bits (bit 7 to bits 0) the bus address of the node.

Broadcast Objects:

Object	Function Code	COB ID hex	COB ID dec	Index in the Object Dictionary
NMT	0000	00H	0	-
SYNC	0001	80H	128	1005H, 1006H, 1007H
TIME STAMP	0010	100H	256	1012H, 1013H

Table 19: COB ID - Broadcast Objects

Peer-to-Peer Objects:

Objects	Function Code	COB ID hex	COB ID dec	Index in the Object Dictionary
Emergency	0001	81H-FFH	129-255	1014H, 1015H
PDO 1 (tx)	0011	181H-1FFH	385-511	1800H (1A00H)
PDO 1 (rx)	0100	201H-27FH	513-639	1400H (1600H)
PDO 2 (tx)	0101	281H-2FFH	641-767	1801H (1A01H)
PDO 2 (rx)	0110	301H-37FH	769-895	1401H (1601H)
PDO 3 (tx)	0111	381H-3FFH	897-1023	1802H (1A02H)
PDO 3 (rx)	1000	401H-47FH	1025-1151	1402H (1602H)
PDO 4 (tx)	1001	481H-4FFH	1153-1279	1803H (1A03H)
PDO 4 (rx)	1010	501H-57FH	1281-1407	1403H (1603H)
SDO (tx)	1011	581H-5FFH	1409-1535	1200H
SDO (rx)	1100	601H-67FH	1537-1663	1200H
NMT Error Control	1110	701H-77FH	1793-1919	1016H, 1017H

Table 20: COB ID - Peer-to-Peer Objects

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6 Glossary

DTM

Device Type Manager

The Device Type Manager (DTM) is a software module with grafical user interface for the configuration and/or for diagnosis of devices.

EDS

An Electronic Data Sheet (EDS) provides information necessary to access and alter the configurable parameters of a device. An Electronic Data Sheet (EDS) is an external file that contains information about configurable attributes for the device, including object addresses of each parameter. The application objects in a device represent the destination addresses for configuration data. These addresses are encoded in the EDS.

FDT

Field Device Tool

FDT specifies an interface, in order to be able to use DTM (Device Type Manager) in different applications of different manufacturers.

Operating Instruction Manual

DTM for ABB DeviceNet Master Devices

Configure ABB Master Devices

Edition: 3
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ABB STOTZ-KONTAKT GmbH
Eppelheimer Straße 82
D-69123 Heidelberg
Deutschland

Tel.: +49 (0) 6221/701-0

Hotline Tel.: +49 (0) 6221/701-1444
Hotline Fax: +49 (0) 6221/701-1382

Email Hotline: Desst.helpline@de.abb.com

Web: www.abb.de/sto

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Although this program has been developed with great care and intensively tested, ABB STOTZ-KONTAKT GmbH cannot guarantee the suitability of this program for any purpose not confirmed by us in writing.

Guarantee claims shall be limited to the right to require rectification. Liability for any damages which may have arisen from the use of this program or its documentation shall be limited to cases of intent.

We reserve the right to modify our products and their specifications at any time in as far as this contribute to technical progress. The version of the manual supplied with the program applies.

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1 Introduction

1.1 About DeviceNet Master DTM

This manual describes the usage of the ABB DeviceNet Master DTM. The DTM is used for the configuration of DeviceNet Master devices within a FDT framework.

This manual describes the device parameters and diagnostic functions.

1.2 Requirements

System Requirements

- Windows® 2000/ Windows® XP
- CD ROM drive
- Graphic resolution: min. 1024 x 768 pixel or higher
- Keyboard and mouse

Requirements ABB DeviceNet Master DTM

To configure an ABB DeviceNet Master device with the DTM the following requirements have to be accomplished:

- Completed hardware installation of a DTM-compatible ABB DeviceNet Master device
- FDT/DTM V 1.20 compliant frame application
- Installed FDT Framework
- Open Project in FDT Framework
- Loaded DTM in the Device Catalog of the FTD Framework

1.3 Dialog Structure of the DeviceNet Master DTM

The dialog window of the DTM is divided in three different areas:

- A header which contains the **General Device Information**.
- The **Pages Tree-View** displayed as tree structure.
- The **Setting, Configuration and Diagnosis Pages**.

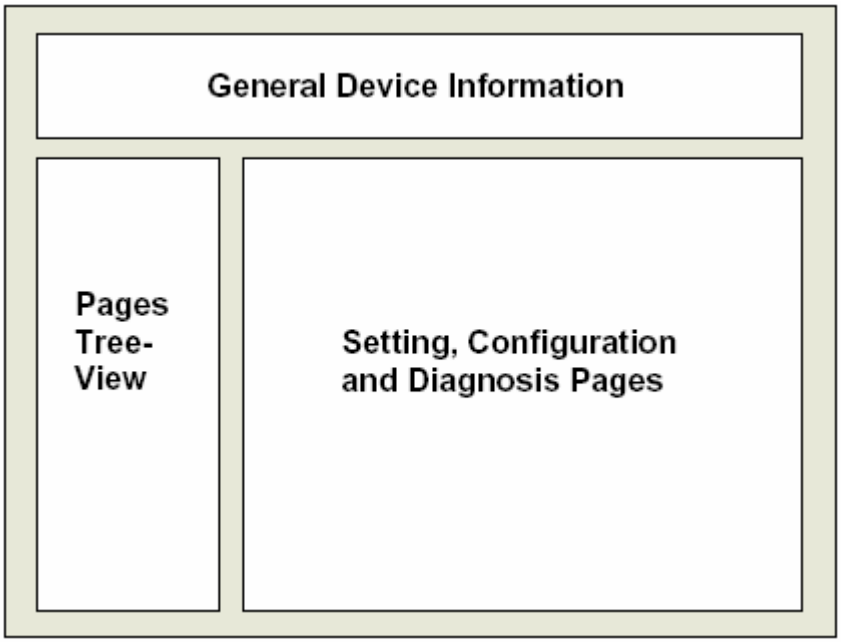


Figure 1: Dialog Structure of DeviceNet Master DTM

1.3.1 General Device Information

The general device information contains specifications of the device. This indication is only for information and can not be edited

The indicated information is **IO Device** (name of the device), the **Vendor**, the **Device ID** and the **Vendor ID**.

Figure 2: General Device Information

1.3.2 Pages Tree-View

The left side shows the pages tree-view:

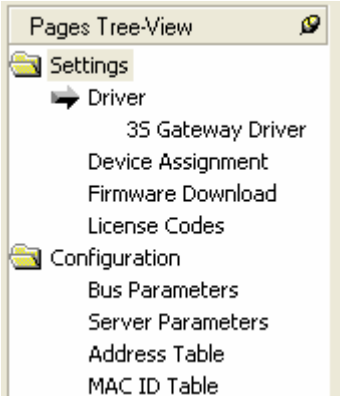


Figure 3: Pages Tree-View Settings and Configuration

Settings	
Driver	On the page **driver** the selection list of the existing drivers is displayed. For the individual drivers additional parameters can be adjusted if necessary. Further information you find in the section *Driver* on page 14.
Device Assignment	This page contains the **Device Assignment**, where the favored driver can be assigned. Further information about this you find in section *Device Assignment* on page 17.
Firmware Download	The dialog on the page **Firmware Download** is used to load a new firmware into the device. A detailed description can be found in section *Firmware Download* on page 19.
License Codes	On the page **License Codes** current device data are displayed and the lozenge code can be entered. Further information to this item you find in the section *License Codes* on page 21.
Configuration	
Bus Parameters	The **Bus Parameters** are the basis of an operating data exchange. Further information about setting the bus parameters are described in section *Bus Parameters* on page *24*.
Server Parameters	The **Server Parameters** contain DeviceNet specific Server Parameters with which the device is able to be a server at the same time being a Master. Further information can be found in section *Server Parameters* on page 26.
Address Table	The **Address Table** shows a list of all addresses used in the process data image. Further information about the address table is described in section *Address Table* on page *27*.
MAC ID Table	The **MAC ID Table**, also called device table, shows the MAC IDs, Device Names and Device Descriptions of the configured slaves. Further information can be found in section *MAC ID Table* on page *29*.

Table 1: Overview Settings and Configuration Pages

1.3.3 Setting, Configuration and Diagnosis Pages

On the setting, configuration and diagnosis pages the device specific settings and the configuration can be made. These one can be edited by entering parameter values or via pull-down menus. On the diagnosis pages diagnosis information out of or to the device can be red and displayed. Therefore a connection to the device is required.

Detailed information to the single pages you can find below in this manual. Subsequently the sections with the descriptions to the single setting, configuration and diagnosis pages for the ABB DeviceNet Master DTM are listed.

Settings

Contents	Page
Overview Settings	*13*
Driver	*14*
Device Assignment	*17*
Firmware Download	*19*
License Codes	*21*

Table 2: Descriptions Setting Pages

Configuration

Contents	Page
Bus Parameters	*24*
Server Parameters	*26*
Address Table	*27*
MAC ID Table	*29*

Table 3: Descriptions Configuration Pages

Diagnosis

Contents	Page
Firmware Diagnosis	*32*
Bus Diagnosis	*33*
Station Diagnosis	*36*

Table 4: Descriptions Diagnosis Pages

Extended Diagnosis

Contents	Page
PLC - Common Variables	*40*
DNM - Common Variables	*41*
DNM - MAC ID Running States	*42*
DNM - Global State Field	*43*
DNM - Communication Error	*45*
DNM - Receive Queue	*46*
DNM - Transmit Queue	*47*

Table 5: Descriptions Pages Extended Diagnosis

1.4 Status Bar

The Status Bar displays information about the current state of the DTM. The meaning of the icons is explained in the following:

Figure 4: Status Bar

Number	Meaning	
1	Name of the Master DTM manufacturer: ABB Stotz-Kontakt GmbH	
2	Connection State Icon closed = Device is online Icon not closed = Device is offline	
3	Offline data: The displayed data are read out from the configuration file (database).	
	Online data: The displayed data are read out online from the device.	
4	Configuration was changed This symbol indicates, that the configuration was changed and these changes have not been saved until yet. When saving the actual configuration, this symbol expires.	
5	Diagnosis is activated	
6	The status of the device is displayed first as icon (6) and below it is indicated in plain text (7). The following states can appear:	
	Info	
	Warning	
	Error	

Table 6: Elements of the Status Bar

1.5 Dialog Buttons

OK

If it is confirmed with **OK**, the settings are stored and the dialog is closed.

Cancel

Clicking the **Cancel** button it is asked to confirm the loss of all modifications made before. If changes at the configuration were made, a safety inquiry follows whether the changes are to be stored or not. Subsequently, the dialog is closed.

Apply

The modifications are stored temporary to the frame applications database when clicking the **Apply** button. The dialog remains opened.

Reset

By means of the **Reset** button changes in the configuration of the frame application are rejected.

Help

For the configuration and diagnosis of the DTM a help file is available. This is opened by clicking the **Help** button.

Selecting, creating, deleting Table Line

To select a line in a table or to create a new one or to delete one the available arrow buttons can be used.

Button	Meaning
	To select the table's first line use the button **First Line**.
	To select the previous line in the table use the button **Previous Line**.
	To select the next line in the table use the button **Next Line**.
	To select the last line in the table use the button **Last Line**.
	The button **Create a new Line** inserts new lines into the table.
	The button **Delete selected Line** deletes the selected line from the table.

Table 7: Meaning of the Buttons selecting, creating, deleting Table Line

Activating / Deactivating Options

To activate an option set a hook into the checkbox.

To deactivate an option remove the hook from the checkbox.

☑ Activated / ☐ deactivated

2 Settings

2.1 Overview Settings

Pages tree-view **Settings** for the DeviceNet Master DTM:

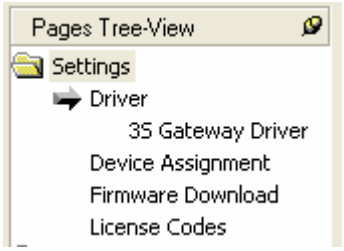


Figure 5: Pages Tree-View - Settings

Descriptions to the setting pages for the DeviceNet Master DTM:

Driver

Contents	Page
Selecting Driver	*14*
3S Gateway Driver	*15*

Table 8: Setting Pages - Driver

Device Assignment

Contents	Page
Scanning Device	*17*
Assigning Device	*18*

Table 9: Setting Pages - Device Assignment

Firmware Download

Contents	Page
Selecting Firmware	*20*

Table 10: Setting Pages - Firmware Download

License Codes

Contents	Page
License Codes	*21*

Table 11: Setting Pages - License Codes

2.2 Driver

By means of the driver selection it is determined how the DeviceNet DTM will communicate with the device which will be assigned later by the device assignment (see section *Device Assignment* on page 17).

2.2.1 Selecting Driver

To select one or several drivers select **Settings > Driver** from the Pages Tree-View. The **Driver** dialog with the selection list of the available drivers is shown. Every recognized or installed driver is displayed.

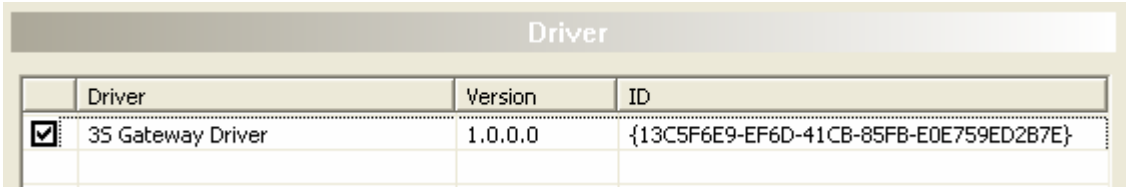


Figure 6: Selection List Driver

The following drivers are available:

- **3S Gateway Driver**

  The Master DTM communicates with the device via a gateway channel.

Select the driver/s to be used in the dialog **Driver** from the selection list (see Figure *Driver Selection List* on page 14).

Only drivers can be selected, the connection specifications of which are supported. Only then a communication between the corresponding master DTM and the device can be established.

Note: In the device assignment (see section *Device Assignment*, on page 17) a connection from the master DTM to the device shall be established by trying to scan the selected driver/s.

Checkbox	Description
☐	Driver is not selected.
☑	Driver is selected.

Table 12: Checkbox Driver

Mark the desired driver/s in the driver selection list by clicking the appropriate checkbox.

2.2.2 3S Gateway Driver

In the dialog window *3 S Gateway Driver* settings can be made on how the configurator can communicate with the device.

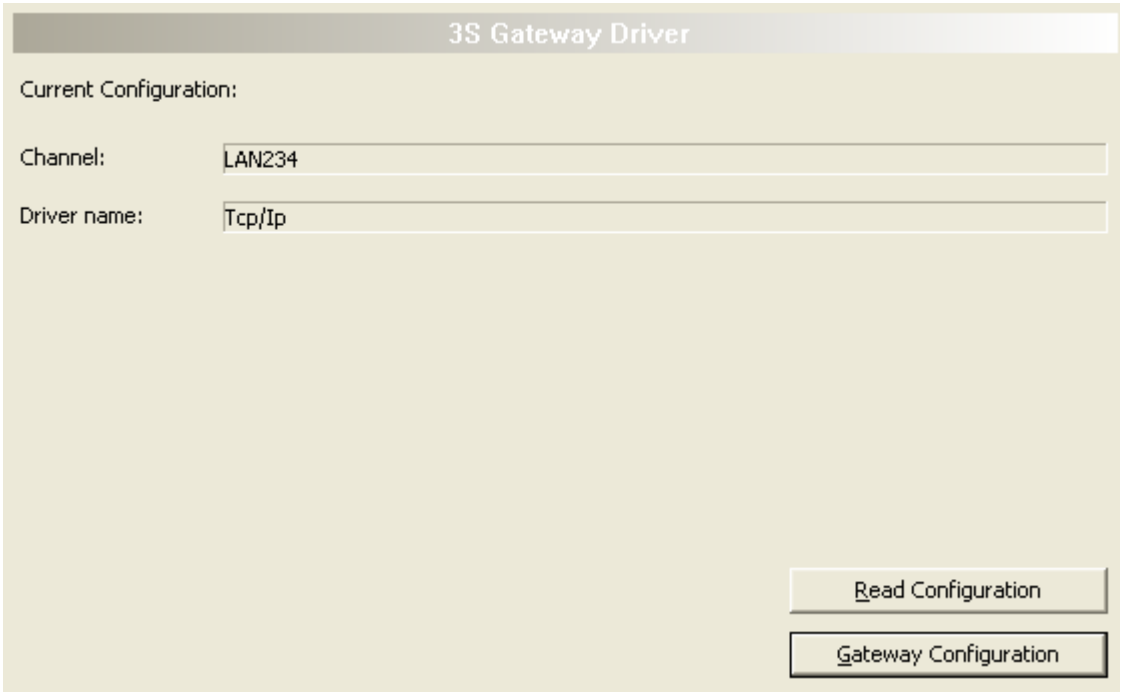


Figure 7: Settings > Driver > 3S Gateway Driver

Term in the dialog	Meaning
Current Configuration	Shows the current configuration of the 3 S Gateway driver.
Read Configuration	Actualizes the display under *Current Configuration*
Gateway Configuration	Opens the window *'Kommunikationsparameter'* (*Communication Parameters*, see figure *3S Gateway Driver - Communication Parameters* on page 16). The communication parameters for the driver configuration can be preset here.

Table 13: Description to the 3S Gateway Driver Dialog

In the window *'Kommunikationsparameter'* the communication parameters for the driver configuration can be adjusted.

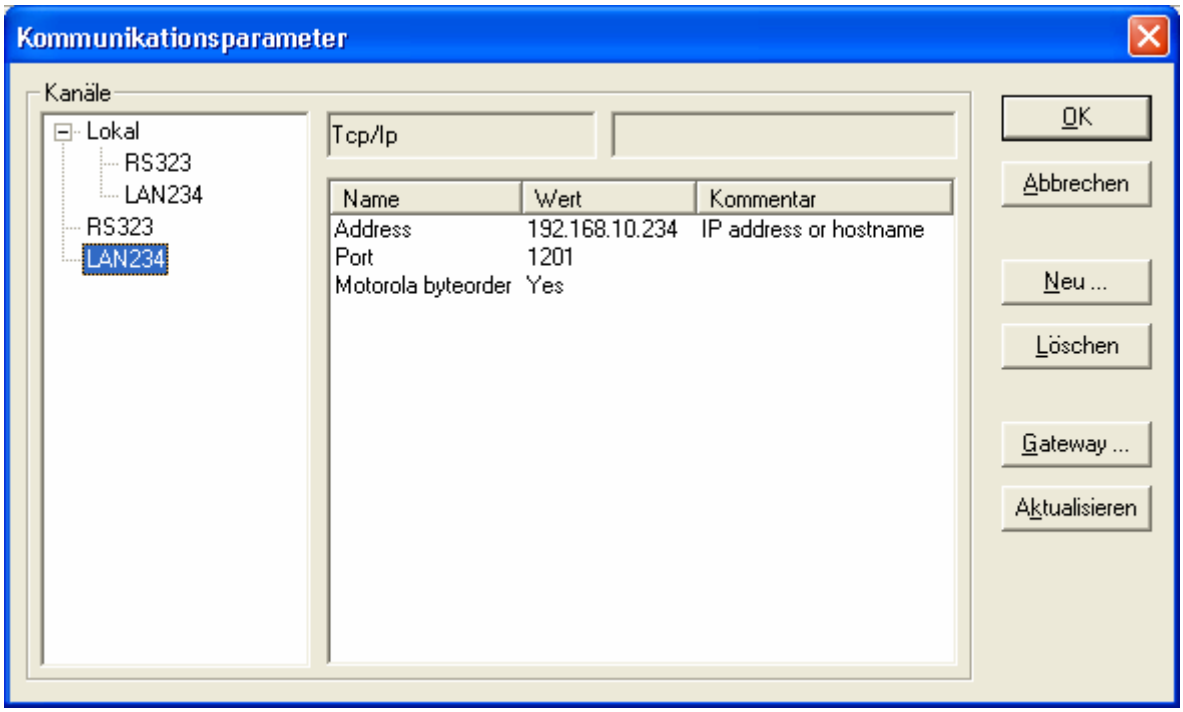


Figure 8: 3S Gateway Driver - Communication Parameters

Note: The detailed description to the dialogue window *Kommunikationsparameter* (communication parameter) is in the ABB manual "Systems Engineering of the CPUs/Coupler".

2.3 Device Assignment

To establish an operating communication between the DTM and a device, a physical device must be assigned to the master DTM. This is done in the **Device Assignment**.

To access the **Device Assignment** dialog, select **Settings > Device Assignment** from the Pages Tree-View. The dialog **Device Assignment** is displayed:

Note: Precondition for the device assignment is the previous selection of one or more drivers (see section *Driver* on page 14).

2.3.1 Scanning Device

To start the scanning process, click to the button **Scan**.

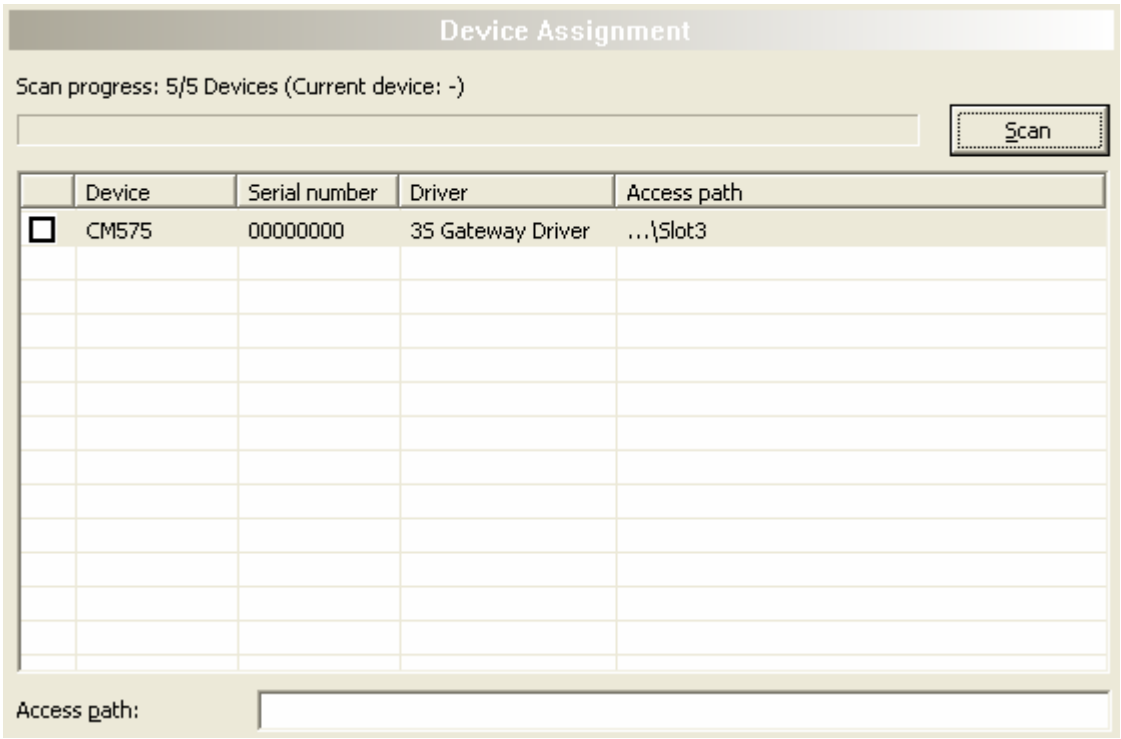


Figure 9: Device Assignment - detected Devices

In the table **Device Assignment** all devices are indicated, which can be connected with the DTM via the drivers selected before.

For every found device the device name, the serial number, the driver and the access path are displayed.

In the field **Access Path** the access path to the selected device is displayed.

2.3.2 Assigning Device

To assign a driver to a device, first the checkbox at the left side of the desired device/ driver must be marked by a hook.

Checkbox	Description
☐	Device is still not assigned.
☑	Device is assigned.

Table 14: Device Assignment - Checkbox Device

Note: A connection can always only be build up to exactly one device.

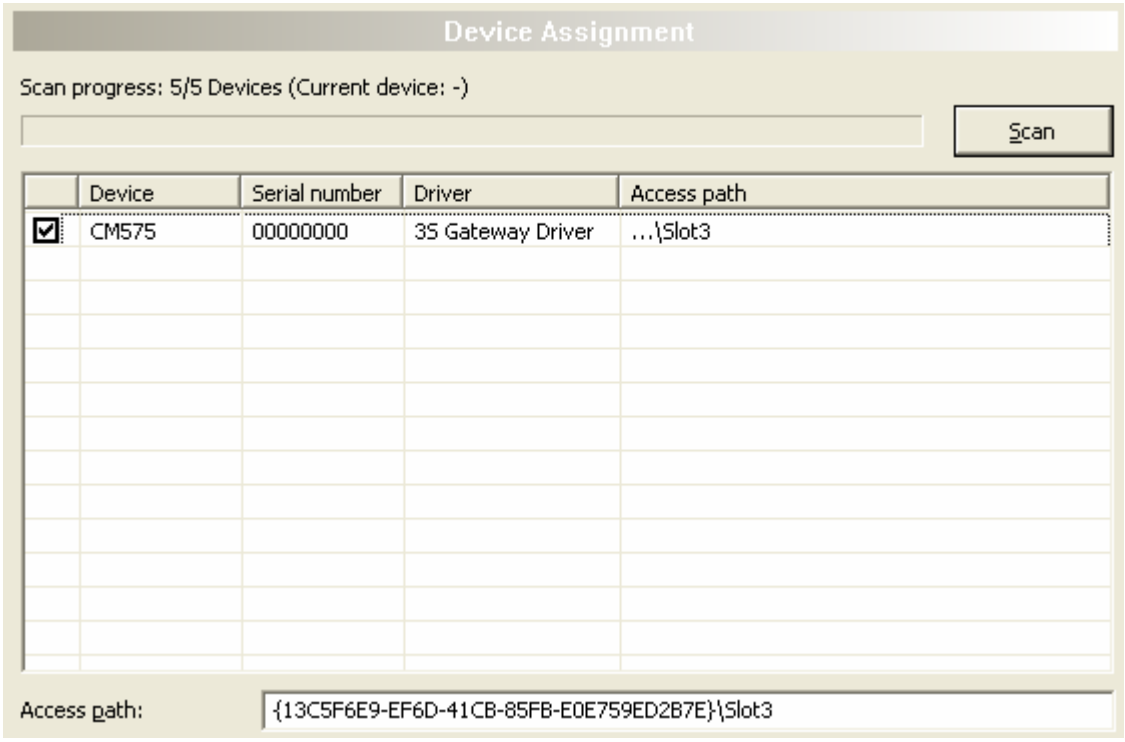


Figure 10: Device Assignment - Assigning Device

Further the selection is to be confirmed by **OK** or **Apply**. Now the selected device is connected with the master DTM.

By clicking to the button Cancel the Device Assignment dialog will be closed without any assignment or changes of an assignment.

Note: To analyze errors which have been occurred during assignment, the diagnostic function **ODMV3 Diagnostic Application** can be used (for further information see manual **ODMV3 Diagnostic Application**).

2.4 Firmware Download

Using the **Firmware Download** dialog a firmware can be transferred to the device, to e. g. load a later version. In this case open the **Firmware Download** dialog.

To access the **Firmware Download** dialog, select **Settings > Firmware Download** from the Pages Tree-View. The dialog **Firmware Download** is displayed.

Note: For firmware download a device must be assigned to a driver. See section *Driver* on page 14.

In order to select a firmware file, click on the **Browse** button. The dialog **Select Firmware File** opens, where the firmware file to be loaded can be selected. A description about this dialog you find in section *Selecting Firmware* on page *20*.

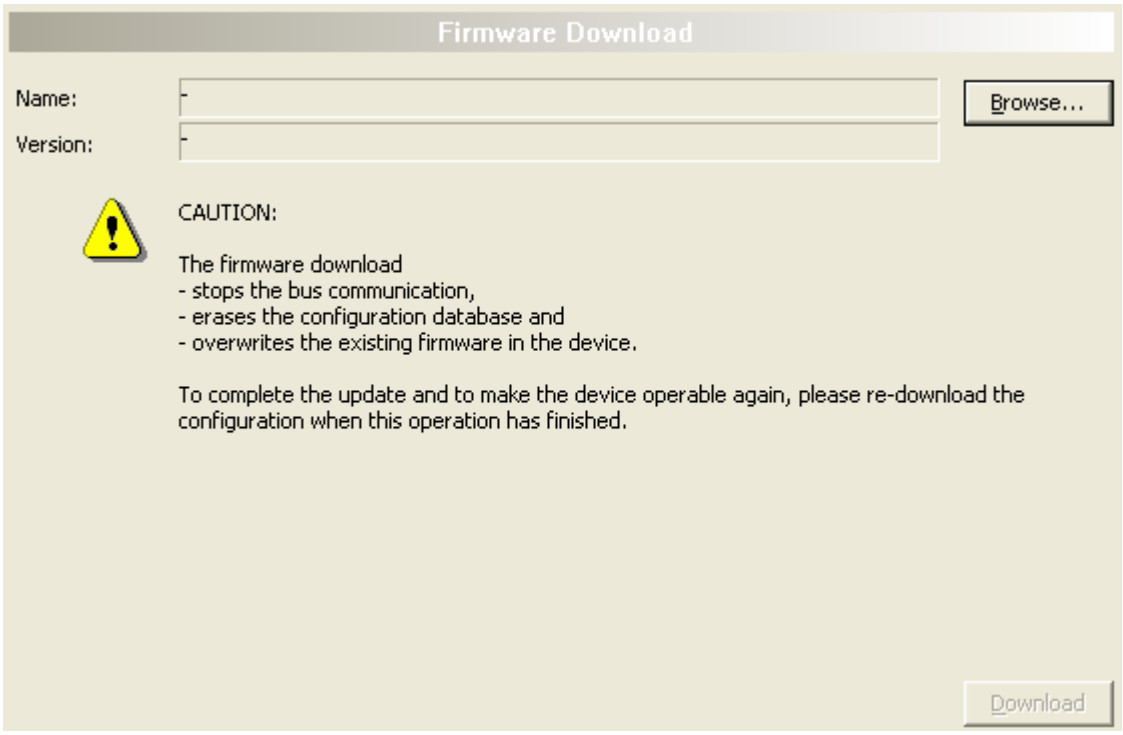

Firmware Download
Name:
Version:
Browse...
CAUTION:
The firmware download
- stops the bus communication,
- erases the configuration database and
- overwrites the existing firmware in the device.
To complete the update and to make the device operable again, please re-download the configuration when this operation has finished.
Download

Figure 11: Firmware Download

After opening the firmware file, the **Name** and the **Version** of the firmware are indicated in the upper section of the dialog.

By clicking the **Download** button, a safety query appears, if you really want to download the new firmware. Confirm this query with **Yes**, to download the new firmware.

2.4.1 Selecting Firmware File

In the **Select Firmware File** dialog window a firmware file can be selected. Therefore select the firmware to be loaded by clicking on it and confirm this selection by clicking on the **Open** button.

In the lower section of the dialog window **Select Firmware File** the following information is shown:

- **File name**
- **File type**
- **Recent folders** and
- **Firmware** (version number).

2.5 License Codes

To access the **License Codes** dialog, select **Settings > License Codes** from the Pages Tree-View. The dialog **License Codes** is displayed.

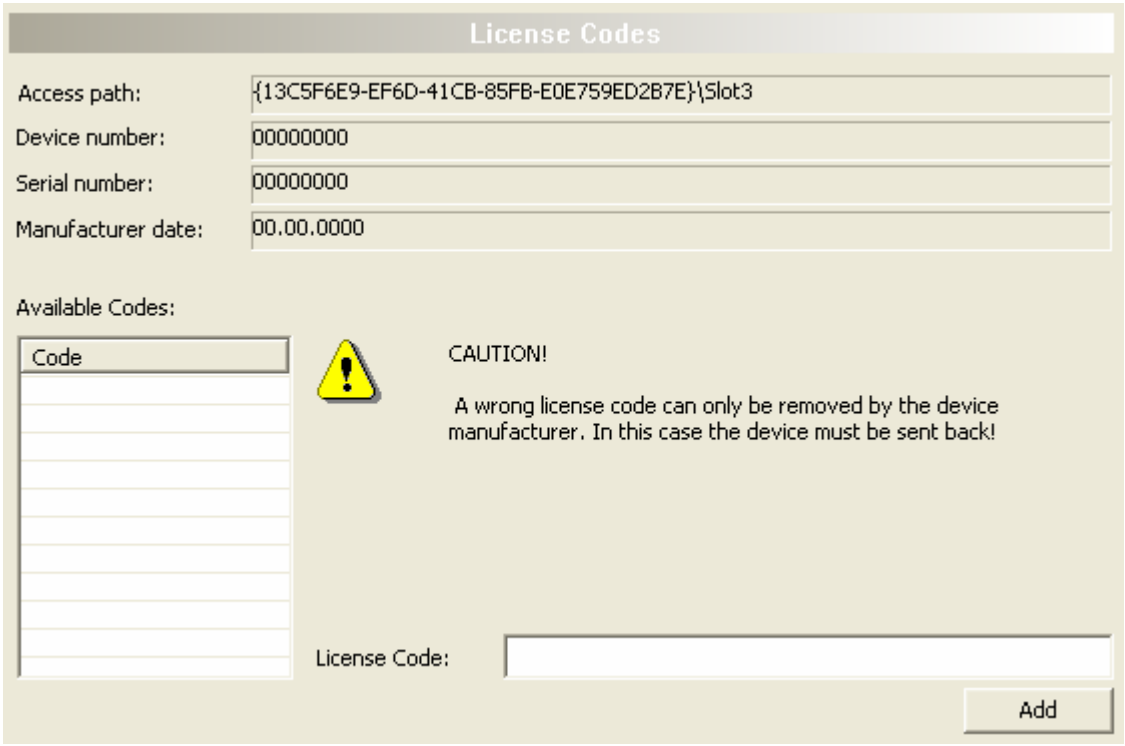


Figure 12: License Codes

After the device has been assigned (see section *Device Assignment* on page 17), the device data and the available license codes are displayed in the **License Codes** dialog.

If a license code must be registered to the device, enter the license code into the window **License Code** and click to the **Add** button.

The resulting character code for the device is saved at the device and is displayed in the **License Codes** dialog under **Available Codes**.

3 Configuration

3.1 Overview Configuration

Pages Tree-View **Configuration** for the DeviceNet Master DTM:

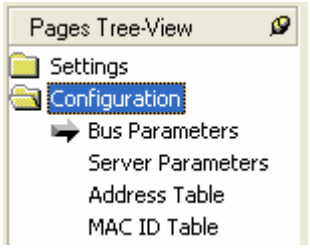


Figure 13: Pages Tree-View - Configuration

Descriptions to the configuration pages for the DeviceNet Master DTM:

Bus Parameters	**Page**
General	*24*
Bus Parameters	*24*
Error Handling	*25*

Table 15: Configuration Pages - Bus Parameters

Server Parameters	**Page**
Server Parameters	*26*

Table 16: Configuration Pages -Server Parameters

Address Table	**Page**
Address Table	*27*

Table 17: Configuration Pages - Address Table

MAC ID Table	**Page**
MAC ID Table	*29*

Table 18: Configuration Pages - Address Table

3.2 Bus Parameters

The **Bus Parameters** are the basis of an operating data exchange. This section contains information for setting the Bus Parameters as well as the description of the individual parameters.

Basic Rule: The Bus Parameters must be set the same for all devices. The Station Address, on the other hand, must be different from device to device.

3.2.1 General

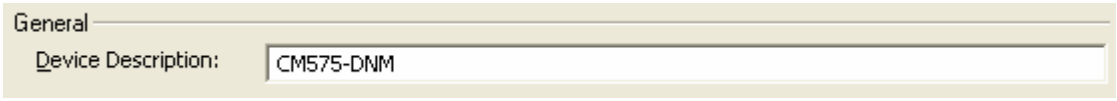


Figure 14: Bus Parameters - General

The symbolic name of the device is displayed in the field **Device Description** and can be changed via entering.

3.2.2 Bus Parameters

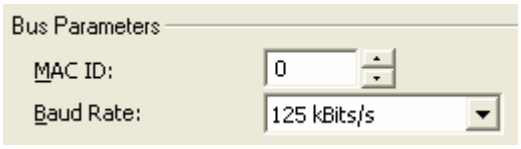


Figure 15: Bus Parameters - Bus Parameters

Bus Parameter	Meaning
MAC ID	The MAC ID is the device address of the DeviceNet Master. Each device must have an own (unique) MAC ID to distinguish it in the network. Range of value: 0 … 63
Baud Rate	This value shows the baud rate to be set to the DeviceNet Master. Range of value: **125 kBits/s**, 250 kBits/s, 500 kBits/s

Table 19: Bus Parameters - Bus Parameters

3.2.3 Error Handling

Figure 16: Bus Parameters - Error Handling

The **Auto Clear** feature defines the behavior of the Master if the communication to a Slave device is disturbed or breaks down.

If **Auto Clear** is checked and a communication disturbance to at least one Slave occurs, the Master operation mode will change from **Operate** to **Clear** and after this into **Stop** and so the communication to all Slaves is stopped. The Master can leave this state only by a reset.

If the **Auto clear** is not activated and a communication disturbance to one or more Slaves occurs, the Master stays in the operation mode **Operate**. The Master still communicates with the existing devices and tries to build up the communication to the missing or faulty devices.

For further information see section *Master Operation Mode* on page *33*.

3.3 Server Parameters

The **Server Parameters** contain DeviceNet specific Server Parameters with which the device is able to be a server at the same time being a Master. This allows an other Master in the network to exchange I/O data with this device, too.

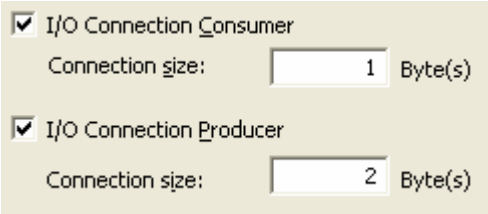


Figure 17: Server Parameters

Server Parameters	Meaning
I/O Connection Consumer	If checked, the server functionality fort he Consume Connection (Receiving data) is enabled and the I/O Consume Connection size can be entered in the field **Connection size**. Range of value: **0** … 255
I/O Connection Producer	If checked, the server functionality fort he Produce Connection (Sending data) is enabled and the I/O Produce Connection size can be entered in the field **Connection size**. Range of value: **0** … 255

Table 20: Server Parameters

3.4 Address Table

The **Address Table** shows a list of all addresses used in the process data image. The displayed addresses refer to the used Master.

Auto Addressing

Figure 18: Address Table - Auto Addressing

The addressing of the process data in the input- and respectively output memory of the Master can be done automatically or manually. The **Auto addressing** is enabled by default.

The addresses for the storage of the **input-** and **output data** are assigned automatically for each connection mode by the DTM on the basis of information about data type and data length.

After deactivation of **Auto addressing** the input address and/or the output address of the connection can be assigned manually. By a click on the address of a connection the field changes into the input mode, in which the new address is entered. Confirming this modification by clicking on the **OK** button, the manual change of the address is taken over.

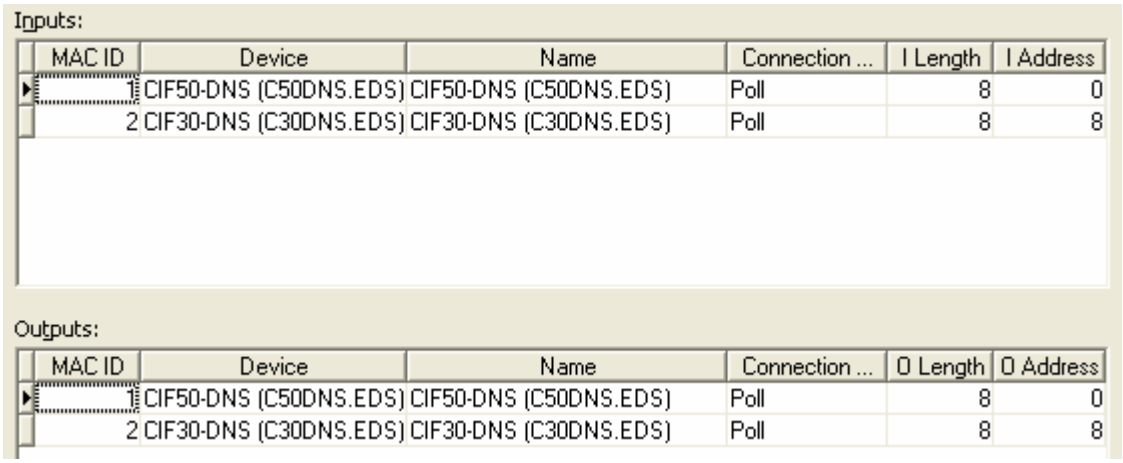

Inputs:
MAC ID | Device | Name | Connection ... | I Length | I Address
1 | CIF50-DNS (C50DNS.EDS) | CIF50-DNS (C50DNS.EDS) | Poll | 8 | 0
2 | CIF30-DNS (C30DNS.EDS) | CIF30-DNS (C30DNS.EDS) | Poll | 8 | 8
Outputs:
MAC ID | Device | Name | Connection ... | O Length | O Address
1 | CIF50-DNS (C50DNS.EDS) | CIF50-DNS (C50DNS.EDS) | Poll | 8 | 0
2 | CIF30-DNS (C30DNS.EDS) | CIF30-DNS (C30DNS.EDS) | Poll | 8 | 8

Figure 19: Address Table - Auto addressing deactivated

If the input and the output addresses of the configured modules were set manually by the user and the option **Auto Addressing** is activated, a message is displayed. This message refers, that the input and the output addresses, defined by the user, are overwritten and automatically generated newly, by means of the data type and the length when activating the **Auto Addressing**.

This message must be confirmed or aborted by the user.

Sort Addresses

It is possible to sort the addresses by clicking on the individual table columns.

3.4.1 CSV Export

The **CSV Export** button allows to export input- and output addresses as CSV file (CSV = comma separated value). The generated data can be opened with a spreadsheet application.

3.5 MAC ID Table

The MAC ID Table, also called device table, shows the **MAC IDs**, **Device Names** and **Device Descriptions** of the currently existing devices in the configuration.

If the field **Activate** is checked, memory for process data of this Slave is reserved in the Master and the Master makes a data exchange to this Slave on the bus.

If this setting is deactivated, the Master reserves memory in the process data image for this Slave, but no data exchange to this Slave is made at the bus.

The displayed values of the **MAC IDs** can be changed by editing. The entered MAC ID must be unique; otherwise an error message is displayed.

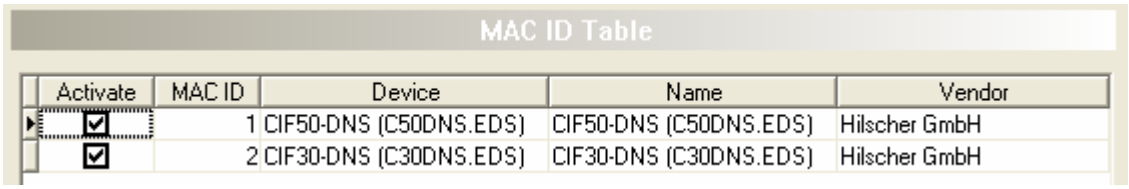


Figure 20: MAC ID Table

4 Diagnosis

4.1 Overview Diagnosis

The **Diagnosis Functions** are mostly called up via the context menu of the device. Admittedly the menu direction depends on the frame application and it can vary.

The **Diagnosis** is shown in two dialogs in which the cyclic states on the bus state and the connected devices are shown.

Built Online Connection

To call up the Diagnosis Functions an online connection to the DTM has to be built up. Information about building up an online connection is described in section *Online to the Device* on page *49*.

Pages Tree-View **Diagnosis** for the DeviceNet Master DTM:

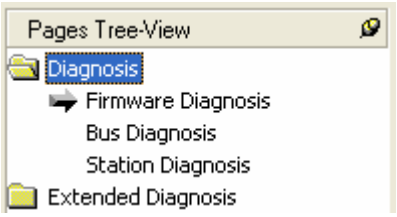


Figure 21: Pages Tree-View - Diagnosis

Descriptions to the diagnosis pages for the DeviceNet Master DTM:

Firmware Diagnosis	**Page**
Firmware Diagnosis	*32*

Table 21: Diagnosis Pages - Firmware Diagnosis

Bus Diagnosis	**Page**
Master Operation Mode	*33*
Master Status	*34*
Server Status	*35*
Bus Monitoring	*35*

Table 22: Diagnosis Pages - Bus Diagnosis

Station Diagnosis	**Page**
Station Status	*36*
Station Error	*37*

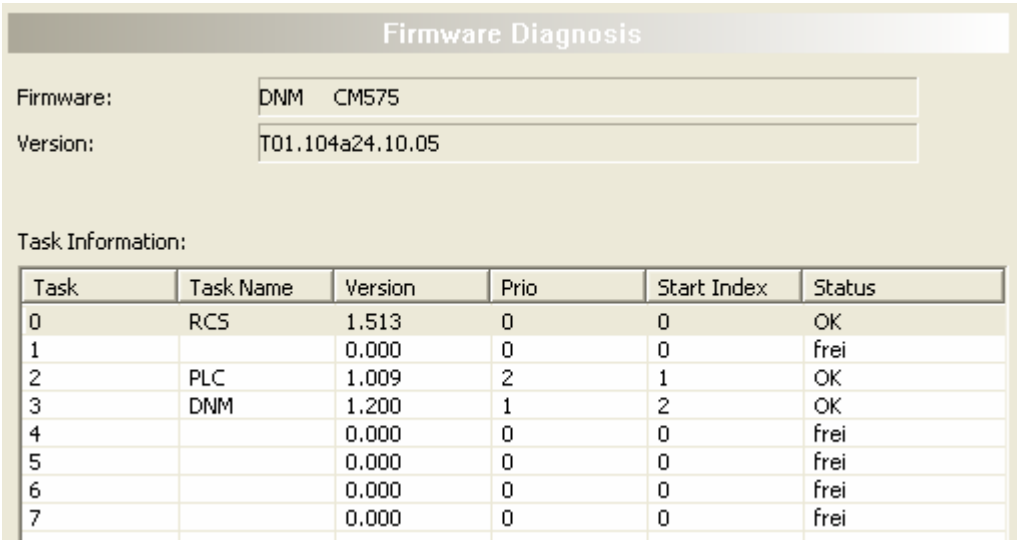
Table 23: Diagnosis Pages - Station Status

More details on extended diagnosis you can find in the section *Extended Diagnosis* from page 39.

4.2 Firmware Diagnosis

In the dialog **Firmware Diagnosis** the actual task information of the firmware is displayed.

Under **Firmware** or **Version** the name of the firmware and version (including the date) are indicated.



Task	Task Name	Version	Prio	Start Index	Status
0	RCS	1.513	0	0	OK
1		0.000	0	0	frei
2	PLC	1.009	2	1	OK
3	DNM	1.200	1	2	OK
4		0.000	0	0	frei
5		0.000	0	0	frei
6		0.000	0	0	frei
7		0.000	0	0	frei

Figure 22: Firmware Diagnosis

Task Information:

The table **Task Information** is listing the task information of the single firmware tasks.

Column	Meaning
Task	Task number
Task Name	Name of the task
Version	Version of the task
Prio	Priority of the task
Start Index	Start index of the task
Status	Status of the task

Table 24: Description Table Task Information

4.3 Bus Diagnosis

4.3.1 Master Operation Mode

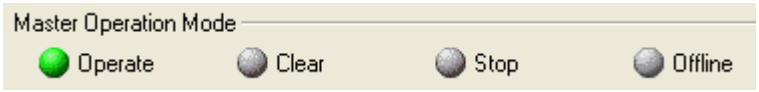


Figure 23: Bus Diagnosis - Master Operation Mode

The **Master Operation Mode** shows the actual status of the Master:

Status	Meaning
Operate	The DeviceNet Master is in data exchange. In a data exchange the inputs of the Slaves are received and the output information is sent to the Slaves.
Clear	The Master reads the input data of the Slaves and holds the outputs of the Slaves in a safe condition.
Stop	The Master is in the Stop state that means no user data exchange takes place between the DeviceNet Master and the Slaves. The Master was stopped by the application program or it had to go in the state Stop because of a bus error.
Offline	The Master does not exist on the bus, it is not on-line. This can happen if no or faulty bus parameters are set for the DeviceNet Master or if no Slaves are configures. Furthermore this can happen, if the correct bus parameters are set, but the application program has not activated the Master for data exchange on the bus.

Table 25: Bus Diagnosis - Master Operation Mode

4.3.2 Master Status

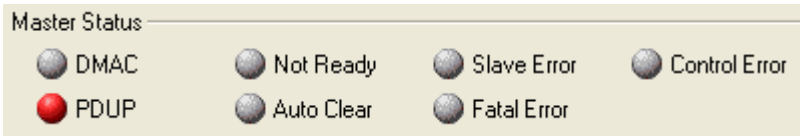


Figure 24: Bus Diagnosis - Master Status

The **Master Status** shows individual bus errors. A pending error is displayed by a red LED. The meaning of the individual errors is described in the following:

Master Status	Meaning
DMAC	The **DUPLICATE-MAC-ID** indicates that the Master has found another device in the network which has the same MAC ID.
PDUP	The **DUPLICATE-MAC-ID check is performed**. As long this bit is set; the Master is involved in handling the duplicate MAC-ID check.
Not Ready	**HOST-NOT-READY** shows, that the application program has not started or it has stopped the DeviceNet Master.
Auto Clear	The **AUTO-CLEAR-ERROR** displays, that device has stopped the communication to all Slaves and it has reached the auto-clear end state.
Slave Error	The **NON-EXCHANGE-ERROR** shows, that at least one Slave is not in the cyclic data exchange with the DeviceNet Master.
Fatal Error	A **FATAL-ERROR** has occurred. Because of a heavy bus error no further bus communication is possible.
Control Error	The **CONTROL-ERROR** displays that a parameterization error has occurred.

Table 26: Bus Diagnosis - Master Status

4.3.3 Server Status

Figure 25: Bus Diagnosis - Server Status

Server Status	Meaning
Poll I/O Connection	Indicates, that the Master as server has build up a Poll I/O Connection.
Explicit Connection	Indicates, that the Master as server has build up an Explicit Connection.

Table 27: Bus Diagnosis - Server Status

4.3.4 Bus Monitoring

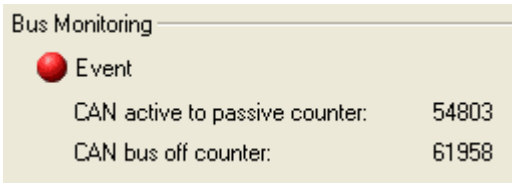


Figure 26: Bus Diagnosis - Bus Monitoring

Bus Monitoring	Meaning
CAN active to passive counter	This value indicates a bad transmission quality at the CAN bus. This counter is based on a Transmission Rejected Error of the CAN chip, which is always reported, whenever an increased number of faulty CAN frames were detected.
CAN bus off counter	This counter counts the number of reported bus off events. A bus off event occurs whenever the CAN bus was disturbed substantially during the transmission of CAN frames and therefore the communication chip has to withdraw itself from the bus.
Event	The used CAN chip has detected transmission errors. The number of detected events is counted in the **CAN bus off counter** and the **CAN active to passive counter**. The bit will be set when the first event was detected and will not be deleted until the Master is reset.

Table 28: Bus Diagnosis - Bus Monitoring

4.4 Station Diagnosis

4.4.1 Station Status

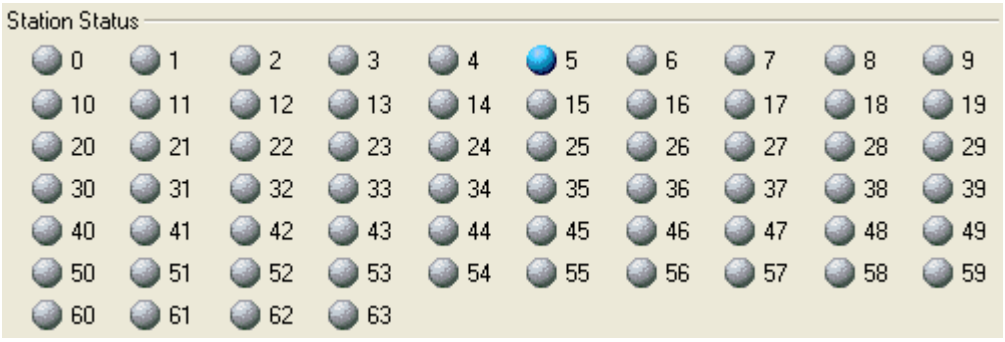


Figure 27: Station Diagnosis - Station Status

Under **Station status** all disposal station addresses (0-63) and their status are shown.

If a connection to the device exists, the DTM updates this display cyclically.

Display of the several Station Addresses

Below the status a legend is represented, which describes possible states of the station addresses.

Figure 28: Station Diagnosis - Station Status

Color of the Station Address	Meaning
grey	The device with this station address is not configured.
green	The device with this station address is running.
yellow	Diagnosis is available for the device with this station address.
blue	The device with this station address was parameterized, but not found on the bus.
red	The device with this station address is faulty.

Table 29: Station Diagnosis - Station Status

4.4.2 Station Error

Figure 29: Station Diagnosis - Station Status - Station Error

Among the **Station Error** field information about the appeared error is shown. This display refers to the lowest station address, which signals Diagnosis. If an internal error has occurred, the Master (MAC-ID 255) signals diagnosis and displays this with **Master**.

The **Station Address** indicates the address of the faulty station. Under **Error Event** the actual error is shown in plain text.

5 Extended Diagnosis

5.1 Overview Extended Diagnosis

The Extended Diagnosis helps to find bus and configuration errors when the standard diagnostic functions are of no further help. The extended diagnosis contains a list of diagnostic structures. These contain online counters, states and parameters.

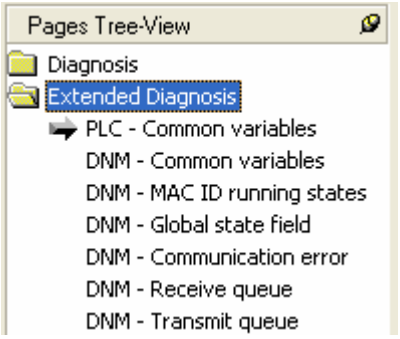


Figure 30: Pages Tree-View - Extended Diagnosis

The following pages for extended diagnosis are available:

Extended Diagnosis	Page
PLC - Common Variables	*40*
DNM - Common Variables	*41*
DNM - MAC ID Running States	*42*
DNM - Global State Field	*43*
DNM - Communication Error	*45*
DNM - Receive Queue	*46*
DNM - Transmit Queue	*47*

Table 30: Pages Extended Diagnosis - Overview

5.1.1 PLC - Common Variables

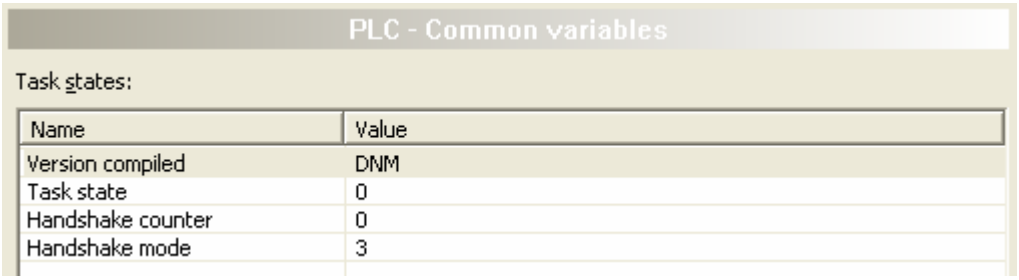


Figure 31: Extended Diagnosis - PLC - Common variables

Name	Value
Version compiled	Hardware
Task state	Task State
Handshake counter	Counter for the performed process data handshakes on the part of application
Handshake mode	This value represents the actual handshake mode between application and device. 0 = Bus synchronous, Device Controlled 1 = Buffered, Device Controlled 2 = No consistence, Uncontrolled 3 = Buffered, Host Controlled 4 = Bus synchronous, Host Controlled

Table 31: Extended Diagnosis - PLC - Common variables

5.1.2 DNM - Common Variables

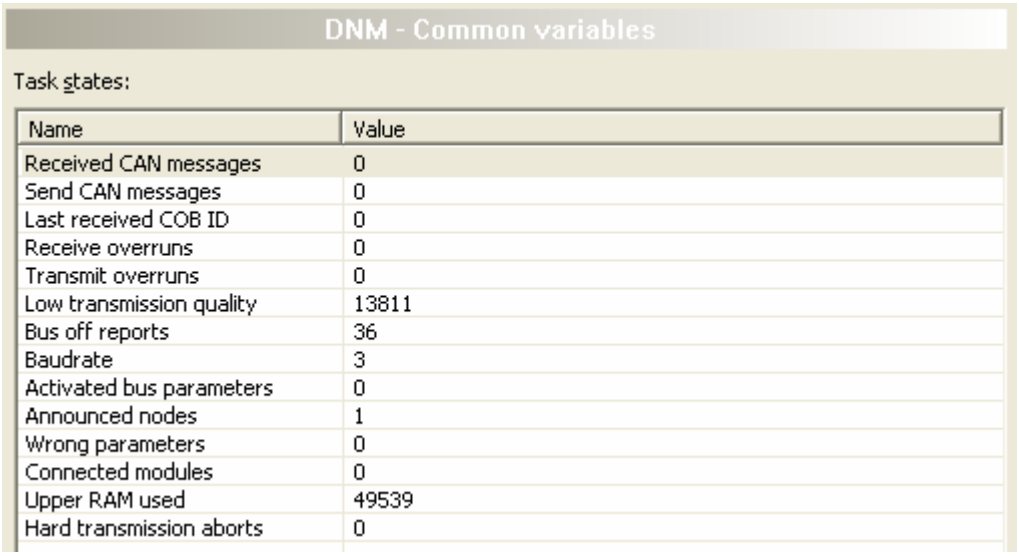


Figure 32: Extended Diagnosis - DNM - Common variables

Name	Value
Received CAN messages	Number of received CAN-Messages
Send CAN messages	Number of sent CAN-Messages
Last received COB ID	Last received CAN-Message Header-ID
Receive overruns	This counter is incrementing when to many incoming CAN messages overload the Master. An incremented counter will always cause lost CAN message data, so it should normally contain the value 0.
Transmit overruns	This counter is incrementing when to many outgoing CAN messages overload the Master. An incremented counter will always cause lost CAN message data, so it should normally contain the value 0.
Low transmission quality	If the internal counter counts the faulty CAN telegrams and oversteps a defined limit, this counter is increased.
Bus off reports	This counter is increased, if the CAN chip has reached the condition ‘bus off’ because of a very high number of CAN message errors or if the network is not supplied with 24 V.
Baud rate	This value shows numeric the actual baud rate the Master is working with (, 1 = 500kBaud, 2 = 250Kbaud, 3 = 125kBaud)
Activated bus parameters	Value 0, the Master has found a configuration data base coming from the DTM, value 1, the Master device isn’t configured and need to be configured via DTM.
Announced nodes	This value represents the number of found device data sets saved in the database of the DTM.
Wrong parameters	This value indicates, if the Master has detected errors in a device data set which was a containment of the actual downloaded database. For each Slave device that has a wrong entry the counter is incremented by 1.
Connected modules	Function is currently not supported.
Upper RAM used	Used upper memory
Hard transmission aborts	This value counts the number of rejected CAN telegrams because of an exceeded maximum send timeout.

Table 32: Extended Diagnosis - DNM - Common variables

5.1.3 DNM - MAC ID Running States

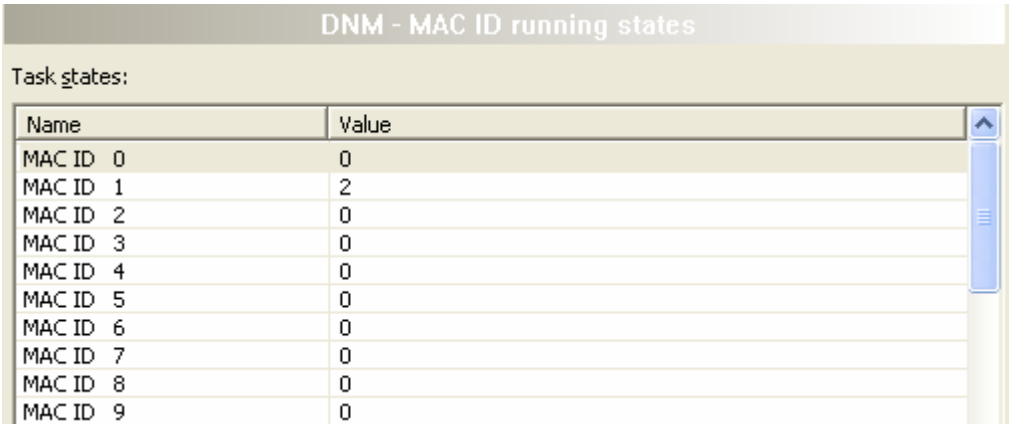


Figure 33: Extended Diagnosis - MAC ID running states

To manage the different device states from the view of the Master, the Master device has a memory.

5.1.4 DNM - Global State Field

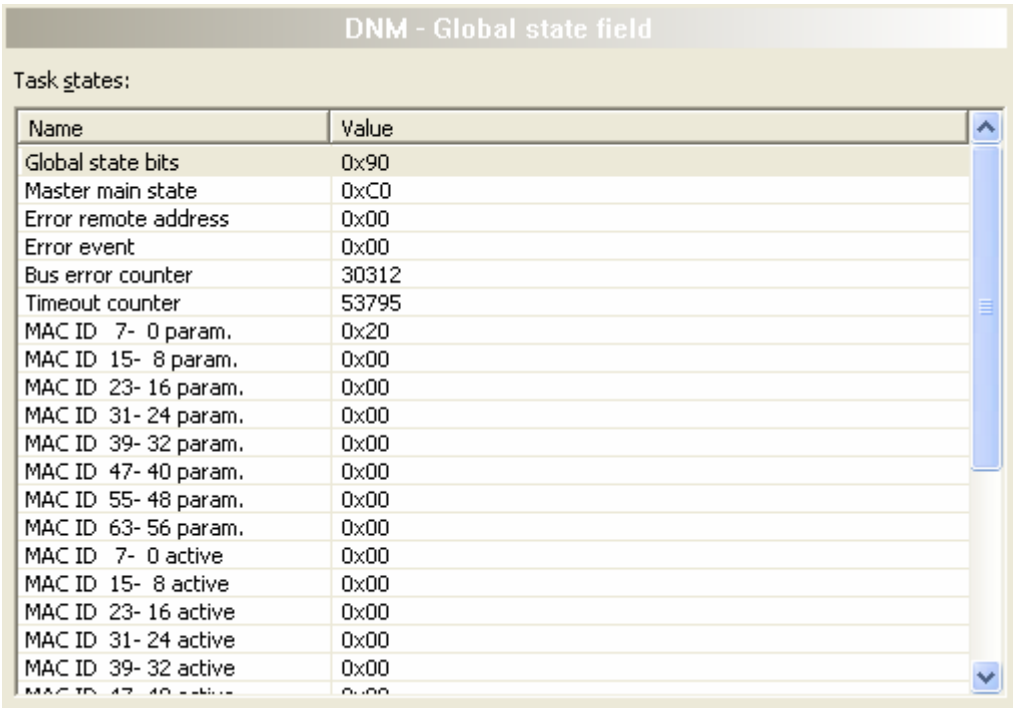

DNM - Global state field
Task states:
Name
Value
Global state bits 0x90
Master main state 0xC0
Error remote address 0x00
Error event 0x00
Bus error counter 30312
Timeout counter 53795
MAC ID 7- 0 param. 0x20
MAC ID 15- 8 param. 0x00
MAC ID 23- 16 param. 0x00
MAC ID 31- 24 param. 0x00
MAC ID 39- 32 param. 0x00
MAC ID 47- 40 param. 0x00
MAC ID 55- 48 param. 0x00
MAC ID 63- 56 param. 0x00
MAC ID 7- 0 active 0x00
MAC ID 15- 8 active 0x00
MAC ID 23- 16 active 0x00
MAC ID 31- 24 active 0x00
MAC ID 39- 32 active 0x00

Figure 34: Extended Diagnosis - Global state field

Name	Value
Global state bits	The ‘Global state bits’ are described in detail in section *Master Status* on page *34*.
Master main state	A description about the task ‘Master main state’ you find in section *Master Operation Mode* on page *33*.
Error remote address	Displays the lowest station address, which signals diagnosis. Further information about this you find in section *Station Status* on page *36*.
Error event	Indicates the occurred error of the ‘Error remote address’. Further information about this you find in section *Station Status* on page *36*.
Bus error counter	The ‘Bus error counter’ is increased, whenever an increased number of faulty CAN frames were detected. For further information see section *Bus Monitoring* on page *35*.
Timeout counter	Number of aborted transmission of CAN message. The messages are lost. It's an indication that no other CAN device was connected or responsive at this time to acknowledge the sent message requests. For further information see section *Bus Monitoring* on page *35*.

More see next page.

MAC ID 7- 0 param.	8 Bit parameter state Slave 0-7
MAC ID 15- 8 param.	8 Bit parameter state Slave 8-15
…	…
MAC ID 63- 56 param.	8 Bit parameter state Slave 56-63
MAC ID 7- 0 active	8 Bit active state Slave 0-7
MAC ID 15- 8 active	8 Bit active state Slave 8-15
…	…
MAC ID 63- 56 active	8 Bit active state Slave 56-63
MAC ID 7- 0 diagnostic	8 Bit diagnostic state Slave 0-7
MAC ID 15- 8 diagnostic	8 Bit diagnostic state Slave 8-15
…	…
MAC ID 63- 56 diagnostic	8 Bit diagnostic state Slave 56-63

Table 33: Extended Diagnosis - Global state field

5.1.5 DNM - Communication Error

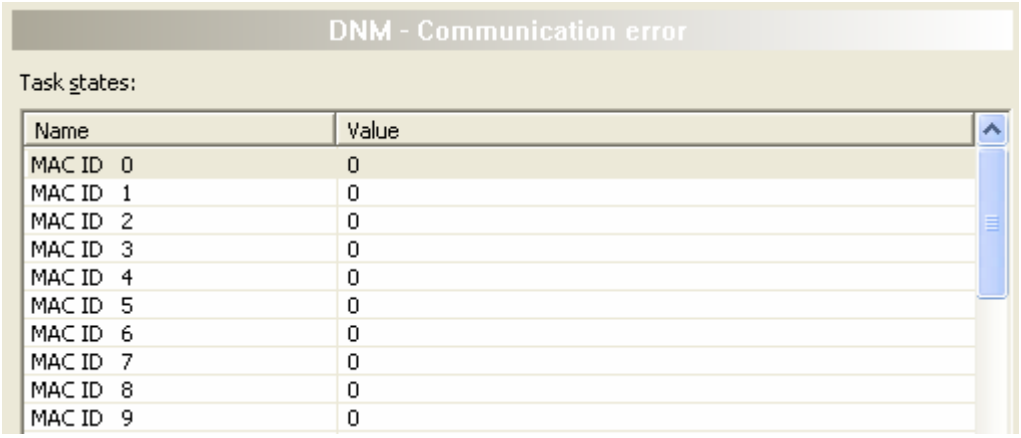


Figure 35: Extended Diagnosis - Communication error

For each Slave device the Master has an internal error status, which is displayed in this dialog window above.

5.1.6 DNM - Receive Queue

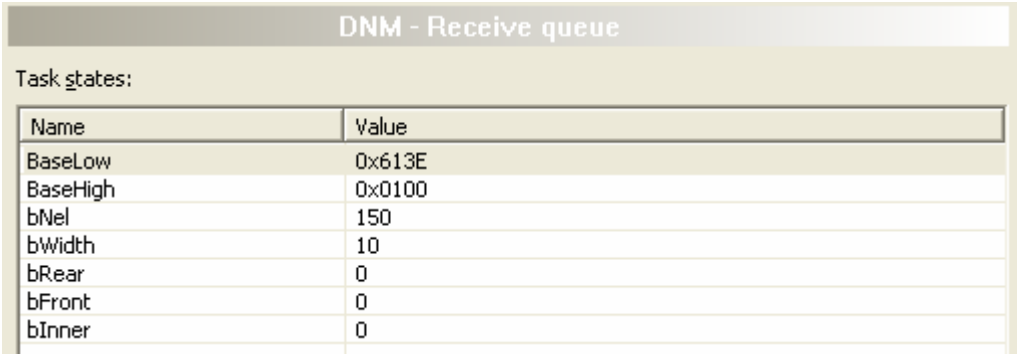


Figure 36: Extended Diagnosis - DNM - Receive queue

The Receive Queue is used to monitor the receive transmission queue of the internal CAN controller.

Name	Value
BaseLow	This value serves only for development.
BaseHigh	This value serves only for development.
bNel	This value serves only for development.
bWidth	This value serves only for development.
bRear	A pointer to where the next message will be dequeued from the queue body
bFront	A pointer to where the next message will be stored
bInner	The actual number of stored messages

Table 34: Extended Diagnosis - DNM - Receive queue

5.1.7 DNM - Transmit Queue

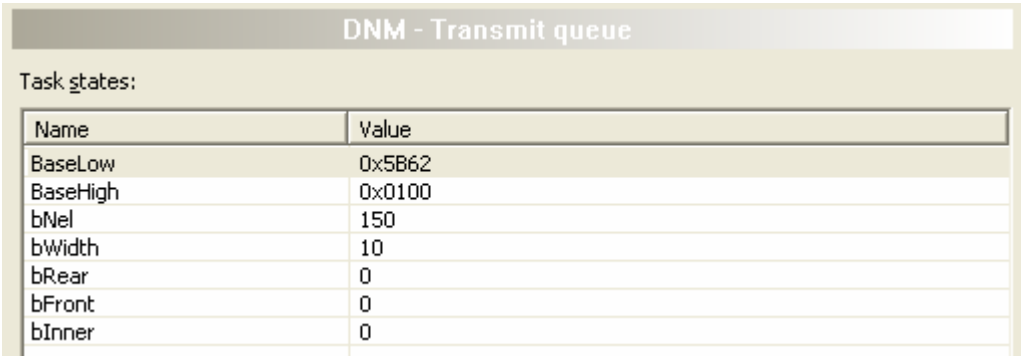


Figure 37: Extended Diagnosis - DNM - Transmit queue

The Transmit Queue is used to monitor the transmit transmission queue of the internal CAN controller.

Name	Value
BaseLow	This value serves only for development.
BaseHigh	This value serves only for development.
bNel	This value serves only for development.
bWidth	This value serves only for development.
bRear	A pointer to where the next message will be deckle from the queue body
bFront	A pointer to where the next message will be stored
bInner	The actual number of stored messages

Table 35: Extended Diagnosis - DNM - Transmit queue

6 Online to the Device

6.1 Connect/Disconnect Device

Note: For several functions e.g. diagnostic, it is necessary, that an online connection to the Master DTM exists.

- **Build up Connection**

  A connection to the device is built up via the context menu of the device.

Now the ABB Master device is online.

The connection is also necessary for several functions apart from the Diagnostic, for example for downloading the configuration. More information about the Download you find in section *Download* on page *49*.

- **Disconnect**

  If the connection to the device should be disconnected, the context menu of this device has to be called up again.

Note: For further information about building up or disconnecting a connection see the description of the frame application.

6.2 Download

A download to the Master has to be made to transfer the configuration with the corresponding parameter data.

Note: Before a download can be made, a connection to the device has to be building up. Further information about building up a connection you find in section *Connect/Disconnect* on page *49*.

If the download was successfully, the actual configuration in the application is loaded down into the Master device.

7 Error Numbers

7.1 Possible PLC Error Messages

Error Number	Description
401	driver error in the control
402	slot number is not supported by the hardware
403	no coupler at the given slot
404	control not in STOP
405	configuration data invalid
406	coupler still configured
407	answer timeout of the coupler

Table 36: Possible Control Error Messages

7.2 RCS Error Numbers

This is the list of error numbers returned by the RCS (Real-time Communication System), that is the operating system of ABB devices. The error number is returned in an answer message. Command messages and answer messages are used to communicate between the application and the ABB device. An example of this communication is the download of a configuration.

Error Number	Description
4	Task does not exist
5	Task is not initialized
6	The MCL is locked
7	The MCL rejects a send command because of an error
20	The user will download a database into the device that is not valid for this device type.
21	Data base segment not configured or not existed
22	Number for message wrong during download
23	Received number of data during download does not match to that in the command message
24	Sequence identifier wrong during download
25	Checksum after download and checksum in command message do not match
26	Write/Read access of data base segment
27	Download/Upload or erase of configured data base type is not allowed
28	The state of the data base segment indicated an error. Upload not possible
29	The access to the data base segment needs the bootstrap loader. The bootstrap loader is not present
30	Trace buffer overflow
31	Entry into trace buffer too long
37	No or wrong license. The OEM license of the System Configurator allows only communication to devices that have the same license inside
38	The data base created by the System Configurator and the data base expected by the firmware is not compatible
39	DBM module missing

Table 37: RCS error numbers (answer message) (4 .. 39)

Error Number	Description
40	No command free
41	Command unknown
42	Command mode unknown
43	Wrong parameter in the command
44	Message length does not match to the parameters of the command
45	Only a MCL does use this command to the RCS
50	FLASH occupied at the moment
51	Error deleting the FLASH
52	Error writing the FLASH
53	FLASH not configured
54	FLASH timeout error
55	Access protection error while deleting the FLASH
56	FLASH size does not match or not enough FLASH memory
60	Wrong structure type
61	Wrong length of structure
62	Structure does not exist
70	No clock on the device
80	Wrong handle for the table (table does not exist)
81	Data length does not match the structure of this table
82	The data set of this number does not exist
83	This table name does not exist
84	Table full. No more entries allowed
85	Other error from DBM
90	The device info (serial number, device number and date) does already exist
91	License code invalid
92	License code does already exist
93	All memory locations for license codes already in use

Table 38: RCS error numbers (answer message) (40 .. 93)

7.3 Database Access Error Numbers

The following table lists the error numbers of the database access errors

Error Number	Description
100	Database already opened
101	Dataset could not be opened
103	Error while opening database occurred
104	No valid path name
105	No connection to data base. Call function DbOpen().
106	Error in parameter
107	Error during opening a table
108	Null pointer occurred
109	Table not opened. Call function OpenTable() first.
110	The first record is reached
111	The last record is reached
112	Unknown type in the record found
113	Data has to be truncated
114	No access driver installed on the system
115	Exception received
116	This table is set to read only
117	There is no data set in the table
118	The requested table could not be edit
119	An operation could not be completed
120	User gives an unexpected length in WriteDs().
121	An assertion failed
122	DLL not found
123	DLL couldn't be freed
124	Specified function not found in the DLL
125	ODBC Function returns an error
126	Count of data bytes in the record exceeds 1938
127	DBM32 DLL is not loaded
128	Field with the given index was not found
129	This table contains no records
130	Invalid character (' ') found in a Table or Column

Table 39: Database Access Error Numbers (100 .. 130)

7.4 Online Data Manager Error Numbers

7.4.1 Online Data Manager Error Numbers

The following table lists the error numbers of the Online Data Manager.

Error Number	Description
1000	Driver OnlineDataManager not opened
1001	Initialization of the OnlineDataManager has failed
1002	No DriverObject found. OnlineDataManager Sub DLL not found.
1003	No DeviceObject found. Device not found.
1004	Application not found
1010	Application has requested an unknown event
1011	Application has requested an unknown function mode, operating mode. Known function modes, operating modes are Reset, Download, Register Server, Unregister Server.
1012	Application has requested an unknown command
1013	Message Server already exists
1014	Message Server not registered
1015	Device already in use
1016	Device not assigned
1017	Device has changed
1018	Command active

Table 40: Online Data Manager Error numbers (1000 .. 1018)

7.4.2 Message Handler Error Numbers

The following table lists the error numbers of the Message handler of the Online Data Manager.

Error Number	Description
2010	Message handler: Messagebuffer empty
2011	Message handler: Messagebuffer full
2021	Message handler: Invalid Message ID (msg.nr)
2022	Message handler: No entry
2023	Message handler: Message already active
2024	Message handler: Wrong Application
2025	Message handler: Message Timeout No message received. **Possible Error Cause:** Different reasons. **(1)** The selected interrupt is not free or used also from another PC component (shared interrupt). **(2)** CIF is not initialized. This is shown by an acyclic flashing RUN LED. **(3)** CIF is in bootstrap loader mode. This is indicated by a flashing RDY LED. **(4)** Another application program is accessing to the CIF the same time as SyCon. **Remedy:** **(1A)** Use polling mode instead of interrupt mode. Shared interrupts are not supported from the CIF device driver under Windows® 95/ Windows® 98/ Windows® ME/ Windows® NT. **(1B)** Use a free interrupt. **(2)** Download the configuration. If necessary create a new configuration. **(3)** First download the firmware and then download the configuration. **(4)** Close all other application programs that communicates to the CIF.
2026	Message handler: Wait for Delete
2027	Message handler: No cyclic Message

Table 41: Error Numbers of the Message Handler of the Online Data Manager (2010 .. 2027)

7.4.3 Driver Functions Error Numbers

The following table lists the error numbers of the Driver Functions of the Online Data Manager.

Error Number	Description
2501	OnlineDataManager Sub DLL not found
2502	Function missing
2503	'Read Thread' not created
2504	'Write Thread' not created
2505	'IO Thread' not created
2510	Function failed
2512	Assign reports error. Return neither OK or cancel

Table 42: Error Numbers of the Driver Functions of the Online Data Manager (2501 .. 2512)

7.4.4 Online Data Manager Sub functions Error Numbers

The following table lists the error numbers of the Sub functions of the Online Data Manager.

Error Number	Description
8001	Driver not opened. E.g. CIF Device Driver
8002	Application has requested an unknown event
8003	Application has requested an unknown command
8004	Command has failed
8005	Command active
8006	Device invalid
8010	No device was assigned
8011	Device was already assigned
8020	Driver not connected
8021	Driver already connected
8030	Faulty 'GetState'
8031	Send error (PutMessage returns error)
8032	Send active (PutMessage active)
8033	Receive error (GetMessage returns error)
8034	Receive active (GetMessage active)
8035	IO Error (ExchangeIO returns error)

Table 43: Sub function Error Numbers of the Driver Functions of the Online Data Manager (8001 .. 8035)

7.5 Data Base Functions Error Numbers

The following table lists the error numbers of the converting functions.

Error Number	Description
4000	File does not exist
4001	Success in compromising
4002	Dataset does not exist
4003	Last respectively first entry reached
4004	Not enough memory
4005	File directory full
4006	Max number of entries reached
4007	No writing to this table possible, because the table is located in the FLASH
4008	Table name does already exist
4009	File name does not exist
4010	Free RAM length from RCS_CNF.P86 is smaller than E_F_INDEX * 2
4011	Parameter ‘next’ wrong
4012	Not enough free space to copy data set
4013	Set is deleted
4014	Value for Index is wrong
4015	Access not allowed
4016	open_file used before init_file
4017	Drive is not ready
4018	Not enough drive memory
4019	File name or path does not exist
4020	Cannot create path
4021	Wrong path
4022	Wrong flag
4023	The delete path is the root path
4024	Path file exists
4025	Write error during write a file
4026	Error during create a file
4027	Error during close a file
4028	No DBM file
4029	Length of the read data is unequal of the file length

Table 44: Error numbers of converting functions (4000 .. 4029)

Error Number	Description
4030	Path too long
4031	Directory changed
4032	Directory created
4034	Length of converting stream is 0
4035	Non equal data set found
4036	Non equal data set found
4037	Non equal data set found
4038	Data set has length 0
4039	The function DbmInit has assigned a Zero pointer during RCS initialization
4040	Printer not ready
4041	The data base is used from another function
4042	New length of data base is smaller than used
4043	Unknown access mode
4044	Old data base has to be converted
4045	Error while converting. Function not known
4046	Unknown type in set 0 found
4047	No float function available
4048	Function not in RCS module
4049	Check failed
4050	Checksum check failed
4051	More segments are existing in file, than in the structure FILE_INFO_T in wMaxEntries
4052	SegLen in structure FILE_INFO_T is smaller then the length in the file. Return of function dbm_restore_data
4053	The header file holds an other information for a length than in the segment itself
4054	Not enough memory for allocation on the PC
4055	No index for file handle in structure FLASH_DIR of RCS found
4057	File type 2 can not be printed because of too many definitions
4058	The definitions need too many lines to display them, than in the program available
4059	An unknown format for the parameter. Valid is U, H, or S
4060	Unknown parameter type

Table 45: Error numbers of converting functions (4030 .. 4060)

Error Number	Description
4061	The data base was transmitted into the FLASH
4062	Set 0 contains no structure definition
4063	Set 0 can not be deleted
4064	Error during execution of a ODBC data base access
4065	Initialization of DBM through RCS had no success
4066	Passed data length incorrect
4067	Sorting function not linked
4068	Error in function parameter
4069	Error from ODBC table
4070	No free handle available. Too many data base links are already opened
4071	Unknown data type found in the table
4072	Structure of table GLOBAL not correct or no such table existing
4073	No name of an ACCESS data base
4074	Download window can’t be created
4075	Download not fully performable

Table 46: Error numbers of converting functions (4061 .. 4075)

Error Number	Description
4082	More than 32 tables should be created
4083	No entry in element szSourceFile
4084	ODBC connection initialization not possible. This could happen when in file ODBCINST.INI in section [Microsoft Access Driver (*.mdb)] is no valid path to ODBCJT16/32.DLL.
4085	Error in structure in the ACCESS data base that is in DBM format
4086	Error in structure in the ACCESS data base that is in DBM format
4087	No data in a ODBC table
4088	No entry
4089	ODBC set length not valid
4090	Not enough data sets in ODBC table
4091	Table Create Tab not found
4092	Error in structure of table CreateTab
4093	No entry in element szSourceTable
4094	No entry in element szDestTable
4095	Entry in iSourceType of table CreateTab is wrong
4096	Entry in iTranslate of table CreateTab is wrong
4097	Function SQLAllocStmt reports an error
4098	ODBC source table not found
4099	ODBC data truncated
4100	Download timeout
4101	Library load error
4102	Library function error
4103	Error in description 'toggle'
4104	Error in description 'KB'
4105	Column does not exist
4106	ODBC structure different
4107	ODBC address error
4108	No CRC sum exists (table GLOBAL exists or old)
4109	Table GLOBAL is old
4110	Calculated CRC different to CRC in table GLOBAL
4199	Programming error

Table 47: Error numbers of converting functions (4082 .. 4199)

7.6 Converting Functions Error Numbers

The following table lists the error numbers of converting functions.

Error Number	Description
5000	Function PackLongToByteShort: Not enough space in pvD (Number of elements greater than reserved memory)
5001	Function PackLongToByteShort: Not enough space in pvD. Detected during converting of pvS
5002	Function PackLongToByteShort: Not enough space in pvD
5003	Function StringToByte: Not enough space in pvD
5004	Function IntToByte: Not enough space in pvD
5005	Function LongToShort: Not enough space in pvD
5006	Function PackStringDumpToByteArray: Not enough space in pvD
5007	Function PackStringBumpToByteArray: A character was found, which is not convertible into a HEX value
5008	Function PackStringDumpToByteArray: Number of character odd
5009	Function PackStringDumpToByteArray: Not enough space in pvD
5010	Function PackStringDumpToByteArray: The current data set needs to be appended the previous one
5011	Function PackStringDumpToByteArray: No corresponding function to the given number exist
5012	Converting error

Table 48: Error Numbers of data base functions (5000 .. 5012)

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9 Glossary

DTM

Device Type Manager

The Device Type Manager (DTM) is a software module with grafical user interface for the configuration and/or for diagnosis of devices.

FDT

Field Device Tool

FDT specifies an interface, in order to be able to use DTM (Device Type Manager) in different applications of different manufacturers.

MAC ID

The network address of a device serves to distinguish itself on a DeviceNet fieldbus system from any other device or Slave on this network. This should be a unique number for each device. A valid MAC-ID address is within a range of 0 to 63 and can be re-entered and changed in the MAC-ID box in the Device Configuration Dialog.

Master

Master devices initiate the data exchange at the bus.

Slave

Slave devices are configured by the Master and perform then the communication.

Operating Instruction Manual

Generic Slave DTM for DeviceNet Slave Devices

Configuration of DeviceNet Slave Devices

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ABB STOTZ-KONTAKT GmbH
Eppelheimer Straße 82
D-69123 Heidelberg
Germany

Tel.: +49(0)6221/701-0

Hotline Tel.: +49(0)6221/701-1444
Hotline Fax: +49(0)6221/701-1382

Email Hotline: Desst.helpline@de.abb.com

Web: www.abb.de/sto

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Although this program has been developed with great care and intensively tested, ABB STOTZ-KONTAKT GmbH cannot guarantee the suitability of this program for any purpose not confirmed by us in writing.

Guarantee claims shall be limited to the right to require rectification. Liability for any damages which may have arisen from the use of this program or its documentation shall be limited to cases of intent.

We reserve the right to modify our products and their specifications at any time in as far as this contribute to technical progress. The version of the manual supplied with the program applies.

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1 Introduction

1.1 About DeviceNet Generic Slave DTM

This manual describes how to set up DeviceNet Slave devices which are described with EDS files. The configuration is made with FDT Frameworks.

If you use such a device in your configuration, you will find a description about the single device parameters and configuration possibilities in this manual. The presentation is universal, but manufacturer-specific characteristics are possible.

1.2 Requirements

Requirements for working with a DeviceNet Generic Slave DTM are:

- Installed FDT Framework
- Installed DeviceNet Master DTM
- Open Project
- DTM need to be loaded in the Device Catalog

Loading EDS Files

To work with the Slave DTMs, the EDS file of the device has to be copied into the EDS folder in the installation directory of the Generic Slave DTM.

Now the Device Catalog has to be reloaded to make the devices available in the FDT Framework.

1.3 Dialog Structure of the DeviceNet Generic Slave DTM

The dialog window of the DTM is divided in three different areas:

- A header which contains the **General Device Information**.
- The **Pages Tree-View**.
- The **Configuration and Device Description Pages**.

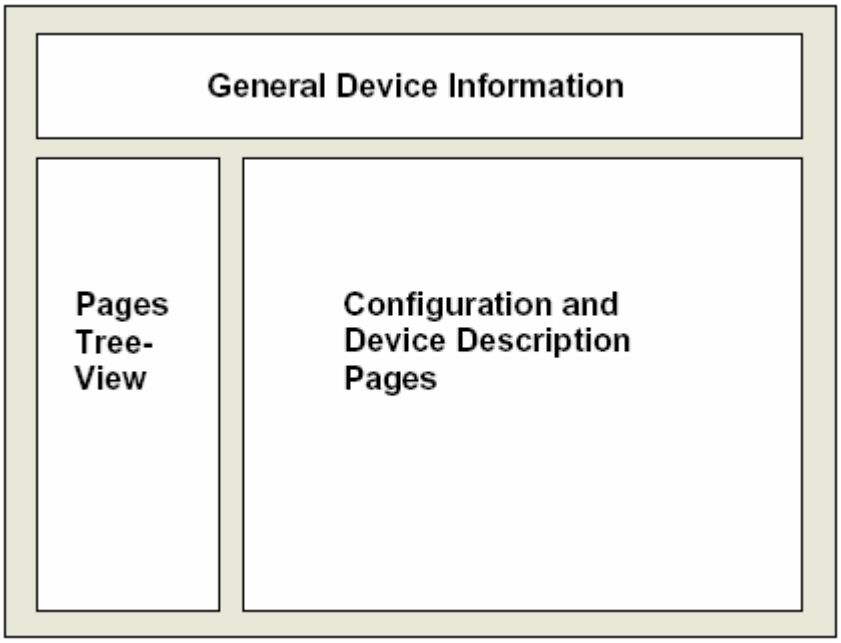


Figure 1: Dialog Structure of the DeviceNet Generic Slave DTM

1.3.1 General Device Information

The general device information contains information about the configured device. This indication is only for information and can not be edited.

The indicated information is **IO Device** (name of the device), the **Vendor**, the **Device ID** and the **Vendor ID**.

Figure 2: General Device Information

1.3.2 Pages Tree-View

The left side of the DTM dialog window shows the pages tree-view:

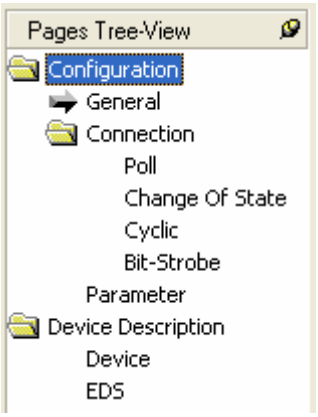


Figure 3: Pages Tree-View Configuration and Device Description

Configuration	
General	On the page **General Settings** the MAC-ID can be read and the parameters 'UCMM ', 'Fragmentation Timeout' or 'Verify Device ID' can be preset. Further information to this you find in section *General Settings* on page *14*.
…Connection	On the page **Connection Configuration** a connection type can be selected and configured. Further information to this you find in section *Connection Configuration* on page *15*.
Parameters	In the **Parameter** dialog the parameter data of the device can be edited. A detailed description you find in section *Parameter* on page *23.*
Device Description	
Device	The **Device Info** page contains the manufacturer information about the device. Further information to this you find in section *Device* on page *26.*
EDS	By use of the **EDS-Viewer** an EDS file can be searched through. Further information to this you find in section *EDS* on page *27.*

Table 1: Overview Configuration and Device Description Pages

1.4 Configuration and Device Description Pages

On the configuration and device description pages the device specific settings and the configuration can be made. These one can be edited by entering parameter values or via pull-down menus.

Detailed information to the single pages you can find below in this manual. Subsequently the sections with the descriptions to the single configuration and device description pages for the ABB DeviceNet Master DTM are listed.

Configuration

Contents	Page
General Settings	*14*
Connection Configuration	*15*
Parameter	*23*

Table 2: Configuration Pages

Device Description

Contents	Page
Device	*26*
EDS	*27*

Table 3: Device Description Pages

1.5 Status Bar

The Status Bar displays information about the current state of the DTM. The meaning of the icons is explained in the following:

Figure 4: Status Bar

Number	Meaning	
1	Name of the Master DTM manufacturer: ABB Stotz-Kontakt GmbH	
2	Connection State Icon closed = Device is online Icon not closed = Device is offline	
3	Offline data: The displayed data are read out from the configuration file (database).	
	Online data: The displayed data are read out online from the device.	
4	Configuration was changed This symbol indicates, that the configuration was changed and these changes have not been saved until yet. When saving the actual configuration, this symbol expires.	
5	Diagnosis is activated	
6	The status of the device is displayed first as icon (6) and below it is indicated in plain text (7). The following states can appear:	
	Info	
	Warning	
	Error	

Table 4: Elements of the Status Bar

1.6 Dialog Buttons

OK

If it is confirmed with **OK**, the settings are stored and the dialog is closed.

Cancel

Clicking the **Cancel** button it is asked to confirm the loss of all modifications made before. If changes at the configuration were made, a safety inquiry follows whether the changes are to be stored or not. Subsequently, the dialog is closed.

Apply

The modifications are stored temporary to the frame applications database when clicking the **Apply** button. The dialog remains opened.

Reset

By means of the **Reset** button changes in the configuration of the frame application are rejected.

EDS Default Values

By clicking on the **EDS Default Values** button, the changes made by the user are cleared and the values are reset to the default values defined in the EDS file.

Help

For the configuration and diagnosis of the DTM a help file is available. This is opened by clicking the **Help** button.

Selecting, creating, deleting Table Line

To select a line in a table or to create a new one or to delete one the available arrow buttons can be used.

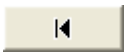
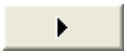
Button	Meaning
	To select the table's first line use the button **First Line**.
	To select the previous line in the table use the button **Previous Line**.
	To select the next line in the table use the button **Next Line**.
	To select the last line in the table use the button **Last Line**.
	The button **Create a new Line** inserts new lines into the table.
	The button **Delete selected Line** deletes the selected line from the table.

Table 5: Meaning of the Buttons selecting, creating, deleting Table Line

Activating / Deactivating Options

To activate an option set a hook into the checkbox.

To deactivate an option remove the hook from the checkbox.

☐ Activated / ☑ deactivated

2 Configuration

2.1 Overview Configuration

Pages Tree-View **Configuration** for the DeviceNet Generic Slave DTM:

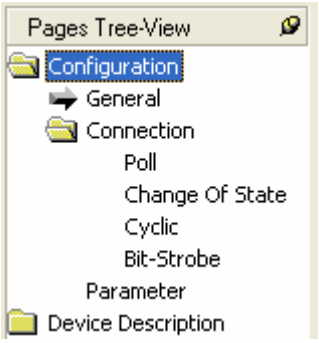


Figure 5: Pages Tree-View - Configuration

Descriptions to the configuration pages for the DeviceNet Generic Slave DTM:

Contents	Page
General Settings	*14*
Connection Configuration	*15*
Poll Connection	*16*
Change of State Connection	*18*
Cyclic Connection	*20*
Bit-Strobe Connection	*21*
Parameter	*23*

Table 6: Configuration Pages

2.2 General Settings

The Dialog **General Settings** contains the following configuration possibilities:

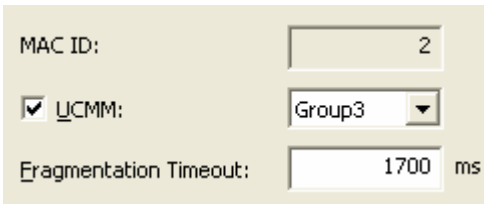


Figure 6: General Settings - Attributes of the device identification

Parameter	Meaning	Range of Value
MAC ID	The **MAC ID** is assigned by the Master and can not be edited here. Changing the MAC ID has to be made with the DeviceNet Master DTM. With each device inserted into the configuration the **MAC ID** is increased automatically by one.	0 … 63
UCMM	If the field **UCMM** is selected, the device is used as UCMM-compatible device. The option **UCMM** is used for devices which need the UCMM message format. Group 1, 2 and 3 are supported. The documentation of the used device gives information whether this option is to be used or not.	Group1, Group2, **Group3**
Fragmentation Timeout	**Fragmentation Timeout** (Expl. Message Timeout): If an IO data transmission or an Explicit Message is larger than 8 byte, this must be transferred fragmented in the DeviceNet (in several telegrams). The **Fragmentation Timeout** specifies, how long the Master waits, until a Slave answers a fragmented telegram. **Note:** Small values can lead to communication disturbances.	0 … **1700** … 65535

Table 7: General Settings - Attributes of the device identification

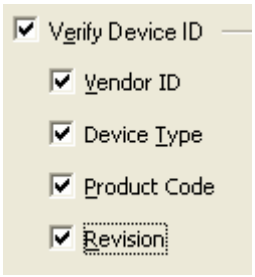


Figure 7: General Settings - Verify Device ID

The function **Verify Device ID** compares the device description in the EDS file of the device with the existing hardware, if the device characteristics of the EDS file agree with those of the hardware.

The check is made for the selected attributes in each case.

2.3 Connection Configuration

DeviceNet allows establishing several kinds of **Connections** between devices. In DeviceNet a device (Slave) is mapped as a collection of objects. These objects communicate via different connection types, which you can adjust under **Connection**.

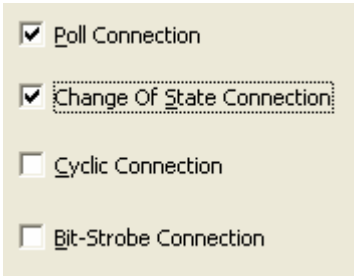


Figure 8: Configuration Dialog Connection

In the **Connection** dialog a connection type or a combination of types can be selected. Please note that a device has not to support all types of IO connections. Connection types which are not supported by the device are automatically disabled.

In the lower section of this dialog the possible combinations of the connection types are displayed:

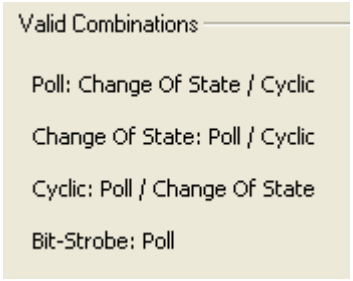


Figure 9: Indication of possible combinations of connection types

If an invalid combination is set, the following warning appears:

Figure 10: Warning invalid connection type combination

2.3.1 Connection Types

The following connection types are available:

Connection Type	Page
Poll Connection	*16*
Change of State Connection	*18*
Cyclic Connection	*20*
Bit-Strobe Connection	*21*

Table 8: Possible connection types

2.3.1.1 Poll Connection

If the **Poll Connection** type was activated, the elements of this connection type are editable. Otherwise this dialog is disabled.

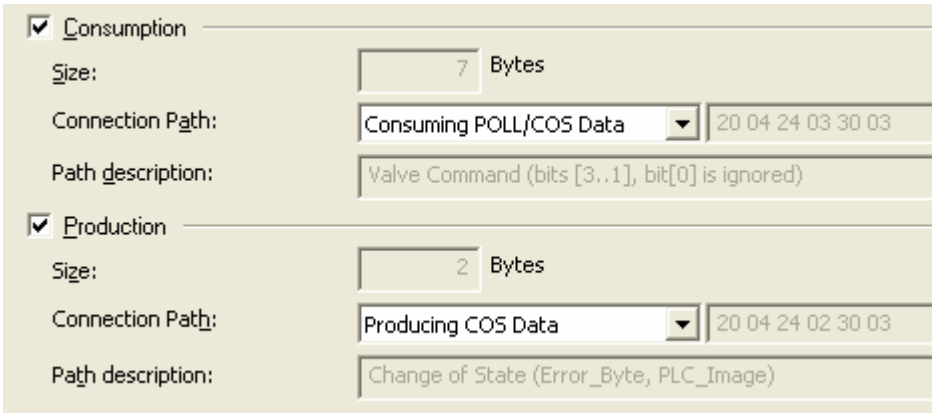


Figure 11: Poll Connection - Consumption and Production

One poll command from the Master sends a number of output data in the poll command to the device. The device receives (consumes) the output data. If it has input data configured for this poll connection it reacts by sending (producing) back the number of input data to the Master. Before a polled I/O connection is initiated by the Master, it reads the consumed and produced connection size of the data from the device (Slave) first and compares this values with the values configured in Master. If different values are detected, the connection cannot be established. A poll command can be sent from the Master to a device. The device has to respond if it has received the poll command of the Master, even if it has no input data. Else the Master will report a timeout error. Polling data to many devices has the disadvantage that the network traffic rate is very high and most data which is transferred has not changed since the last transmission. Furthermore the higher the bus load more communication errors can occur if the bus is disturbed by external influences.

Figure 12: Poll Connection - Timing

The **Production Inhibit Time**, one for each connection, configures the minimum delay time between new data production in multiples of a millisecond. The timer is reloaded each time new data production through the established connection occurs. While the timer is running the device suppresses new data production until the timer has expired. This method prevents that the device is overloaded with to fast incoming requests.

The value 0 defines no **Production Inhibit Time** and data production can and will be done as fast as possible. If in polled mode for example a Production Inhibit Time of 1000 ms is configured, then the poll request message to the device will be sent every second.

The **Expected Packet Rate**, one for each connection, is always transferred to the device before starting and doing the I/O transfer. The fourfold value is used by the device later to reload its 'Watchdog Timer'. If no data production of the remote station takes place within this time, so the connection changes into a watchdog timeout error. Incoming data productions of the remote station load the Watchdog Time again to the fourfold value of the **Expected Packet Rate**.

Note: the **Production Inhibit Time** is verified against the **Expected Packet Rate**. If the **Expected Packet Rate** value is unequal to zero, but less than the **Production Inhibit Time** value, then an error message is displayed by the application.

A description about the pull-down menu **Watchdog Timeout Action** you find in section *Watchdog Timeout Action* on page *22*.

2.3.1.2 Change of State Connection

If the **Change of State Connection** type was activated, the elements of this connection type are editable. Otherwise this dialog is disabled.

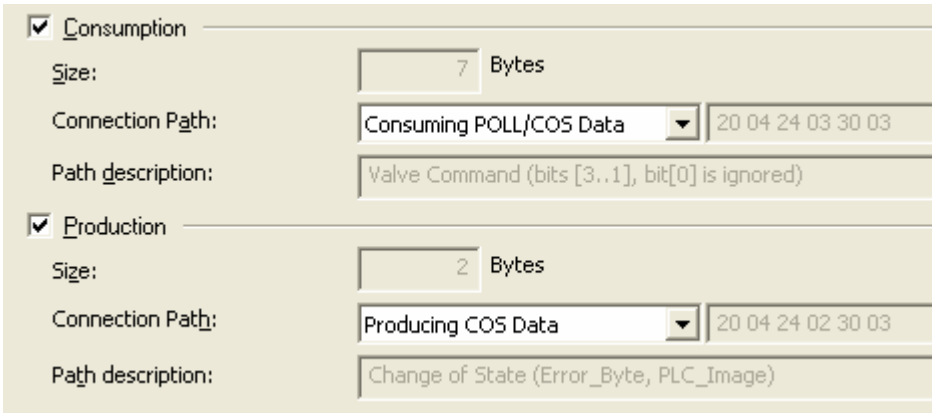


Figure 13: Change of State Connection - Consumption and Production

With this type of connection both Master and Slave send the configured amount of data (max. 255 Byte) to the respective remote station. This data production is started at change in value (trigger). If the data production does not take place during a defined time interval, the devices trigger the data production automatically to load the Watchdog Timer of the connection again. Depending on how the device behavior is configured, they can send back a confirmation message which contains any quantity of data and/or status information. Before a **Change of State** connection is initialized by the Master, it reads out the consumed and produced connection size of the data from the device (Slave) and compares this values with the values configured in the Master during configuration. If different values are determined, the connection can not build up. Data production only over 'Change of State' keeps the bus load as low as possible, while data than can be transmitted as fast as possible by each device because bus conflicts are less possible. So you can get high performance data transmission with in comparison low baud rates.

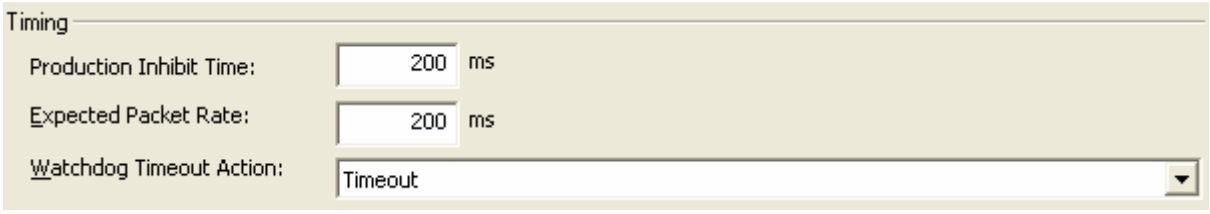


Figure 14: Change of State Connection - Timing

The **Production Inhibit Time**, one for each connection, configures the minimum delay time between new data production in multiples of a millisecond. The timer is reloaded each time new data production through the established connection occurs. While the timer is running the device suppresses new data production until the timer has expired. This method prevents that the device is overloaded with to fast incoming requests.

The value 0 defines no **Production Inhibit Time** and data production can and will be done as fast as possible.

The **Expected Packet Rate**, one for each connection, is always transferred to the device before starting and doing the I/O transfer. The value is used by the device to reload its 'Transmission Trigger' and 'Watchdog Timer'. In **Change of State** connections the fourfold value of **the Expected Packet Rate** is used to build the 'Watchdog Timer'. If no data production of the remote station takes place within this time, so the connection changes into a watchdog timeout error. Incoming data productions of the remote station load the Watchdog Time again to the fourfold value of the **Expected Packet Rate**.

If a data production did not take place since starting the 'Transmission Trigger Timer' as single values of the **Expected Packet Rate**, so the device triggers a data production at the latest then automatically.

Note: the **Production Inhibit Time** is verified against the **Expected Packet Rate**. If the **Expected Packet Rate** value is unequal to zero, but less than the **Production Inhibit Time** value, then an error message is displayed by the application.

A description about the pull-down menu **Watchdog Timeout Action** you find in section *Watchdog Timeout Action* on page *22*.

2.3.1.3 Cyclic Connection

If the **Cyclic Connection** type was activated, the elements of this connection type are editable. Otherwise this dialog is disabled.

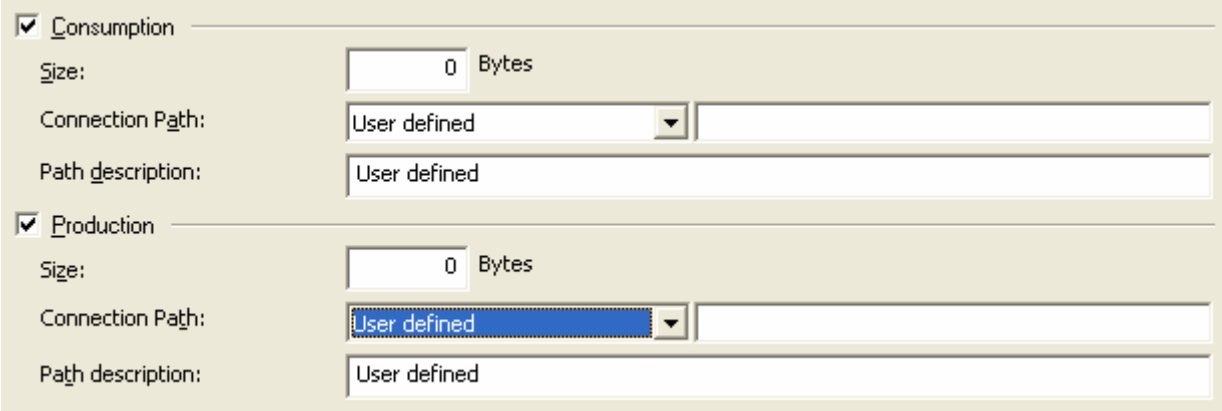


Figure 15: Cyclic Connection - Consumption and Production

At this transmission type a data production takes place automatically, if the 'Transmission Trigger Timer' has expired as single value of the **Expected Packet Rate**.

Figure 16: Cyclic Connection - Timing

The **Expected Packet Rate**, one for each connection, is always transferred to the device before starting and doing the I/O transfer. The value is used by the device to reload its 'Transmission Trigger' and 'Watchdog Timer'. In **Cyclic** connections the fourfold value of the **Expected Packet Rate** is used to reload the 'Transmission Trigger Timer' and the 'Watchdog Timer'. If no data production of the remote station takes place within this time, so the connection changes into a watchdog timeout error. Incoming data productions of the remote station load the Watchdog Time again to the fourfold value of the **Expected Packet Rate**.

A description about the pull-down menu **Watchdog Timeout Action** you find in section *Watchdog Timeout Action* on page *22*.

2.3.1.4 Bit-Strobe Connection

If the **Bit-Strobe Connection** type was activated, the elements of this connection type are editable. Otherwise this dialog is disabled.

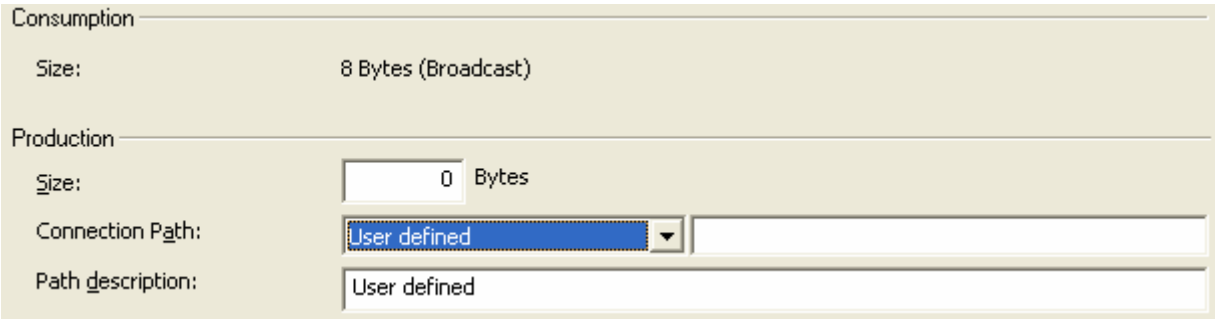


Figure 17: Bit-Strobe Connection - Consumption and Production

Bit strobe command and response messages rapidly move small amounts of output data between the Master device and one/some/all Slave devices. The bit strobe message contains a bit string of 64 bits of output data, one output bit per possible device. Each bit in there is assigned to one device address (MAC-ID) in the network. Herewith this service has broadcast functionality that means more than one Slave device can be addressed by one command. Because all addressed Slave devices get this command at the same time, this command is normally used to synchronize data transfer to several Slave devices. A Slave device can take its corresponding output bit as a real output information to give it to the peripheral connections (e.g. an LED) and/or use the bit as a trigger to send back its input data with a poll response message. The data that can be sent back from each Slave after a bit strobe command was received is limited to 8 bytes in length. Bit strobe usage causes therefore a reduced bus loading than poll connections.

Figure 18: Bit-Strobe Connection - Timing

The **Expected Packet Rate**, one for each connection, is always transferred to the device before starting and doing the I/O transfer. The fourfold value is used by the device later to reload its 'Watchdog Timer'. If no data production of the remote station takes place within this time, so the connection changes into a watchdog timeout error. Incoming data productions of the remote station load the Watchdog Time again to the fourfold value of the **Expected Packet Rate**.

A description about the pull-down menu **Watchdog Timeout Action** you find in section *Watchdog Timeout Action* on page *22*.

2.3.2 Watchdog Timeout Action

The **Watchdog Timeout Action** defines the device behavior when the watchdog timer in the device (Slave) expires. The following actions are adjustable:

- **Timeout:** The connection transitions to the timeout state and remains in this state until it is Reset or Deleted.
- **Auto delete:** The connection class automatically deletes the connection if it experiences an Inactivity/Watchdog timeout.
- **Auto reset:** The connection remains in the established state and immediately restarts the Inactivity/Watchdog timer.

2.4 Parameter

In the **Parameter** dialog the parameter data of the device can be edited.

If default parameters are configured in the EDS file for this device, these are inserted automatically. Some of devices need further parameterization data, to change for example a measurement limitation or a value range. These data are device specific and their functionality can not be explained at this point. The explanation can be found in the corresponding device manual.

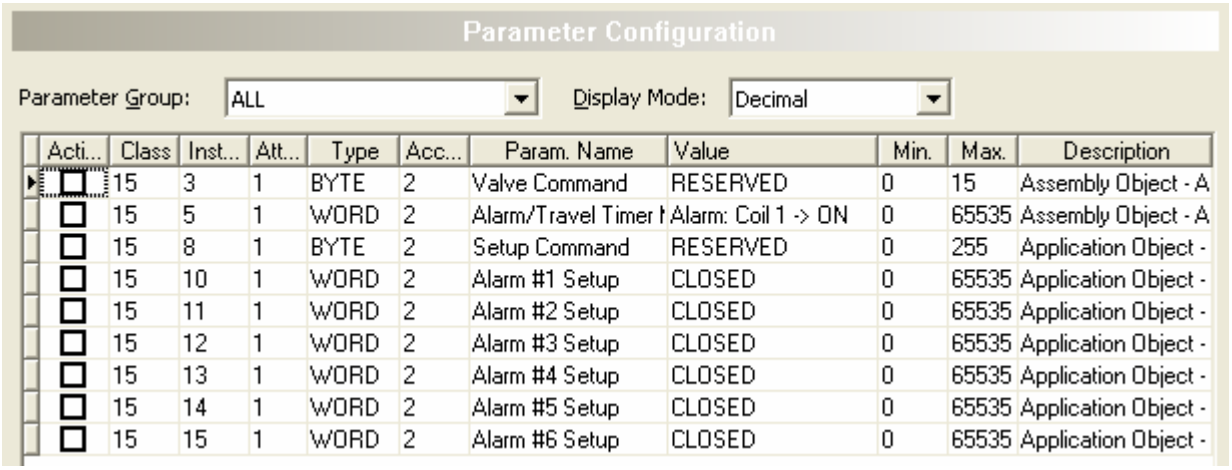

Parameter Configuration
Parameter Group: ALL
Display Mode: Decimal
Acti... Class Inst... Att... Type Acc... Param. Name Value Min. Max. Description
15 3 1 BYTE 2 Valve Command RESERVED 0 15 Assembly Object - A
15 5 1 WORD 2 Alarm/Travel Timer I Alarm: Coil 1 -> ON 0 65535 Assembly Object - A
15 8 1 BYTE 2 Setup Command RESERVED 0 255 Application Object -
15 10 1 WORD 2 Alarm #1 Setup CLOSED 0 65535 Application Object -
15 11 1 WORD 2 Alarm #2 Setup CLOSED 0 65535 Application Object -
15 12 1 WORD 2 Alarm #3 Setup CLOSED 0 65535 Application Object -
15 13 1 WORD 2 Alarm #4 Setup CLOSED 0 65535 Application Object -
15 14 1 WORD 2 Alarm #5 Setup CLOSED 0 65535 Application Object -
15 15 1 WORD 2 Alarm #6 Setup CLOSED 0 65535 Application Object -

Figure 19: Parameter Configuration

Parameter	Value	Description
Parameter Group	**ALL**	All parameter groups defined in the EDS file are merged in one table.
	USER DEFINED	A parameter group defined by the user is displayed.
	xxx	In the EDS file of the device further parameter groups can be defined, which are also displayed in the pull-down menu Parameter Group. The name of this parameter group itself is also defined in the EDS file.
Display Mode	**Decimal**	The values **Min** and **Max** in the table are indicated in decimal notation by default. By selecting the **Display Mode** Hexadecimal the values are shown in hexadecimal notation.
	Hexadecimal	

Table 9: Change Parameter Data

By using a data set the respective parameter value for the Master configuration are approved and transferred to the Slave by the Master during the initialization phase.

A description of the individual parameters, indicated by **Class**, **Instance** and **Attribute**, can be refered in the device description of the manufacturer.

If "**User Defined**" is selected in **Parameter Group**, the entries in the columns **Param. Name** and **Value** are editable. Otherwise the entries are fixed and can not be changed.

3 Device Description

3.1 Overview Device Description

Pages Tree-View **Device Description** for the PROFIBUS Generic Slave DTM:

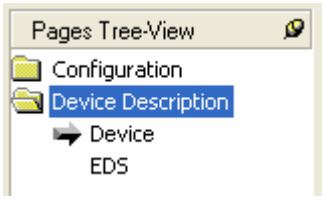


Figure 20: Pages Tree-View - Device Description

The folder **Device Description** contains the device information and an EDS Viewer.

Descriptions to the configuration pages for the PROFIBUS Generic Slave DTM:

Contents	Page
Device	*26*
EDS	*27*

Table 10: Device Description Pages

3.2 Device

The **Device Info** dialog contains manufacturer information about the device, which is defined in the EDS file. The following information is indicated:

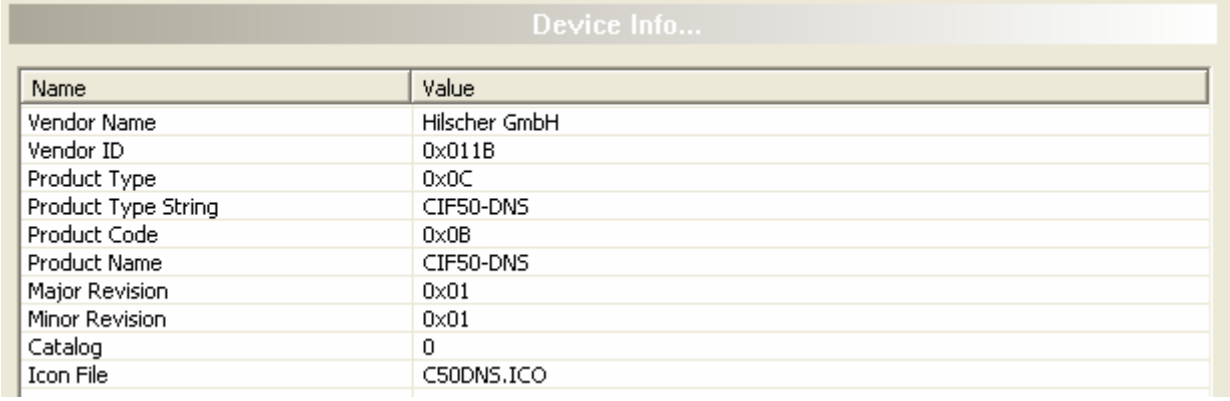


Figure 21: Device Description - Device

3.3 EDS

The **EDS Viewer** shows the content of the EDS file in a text view.

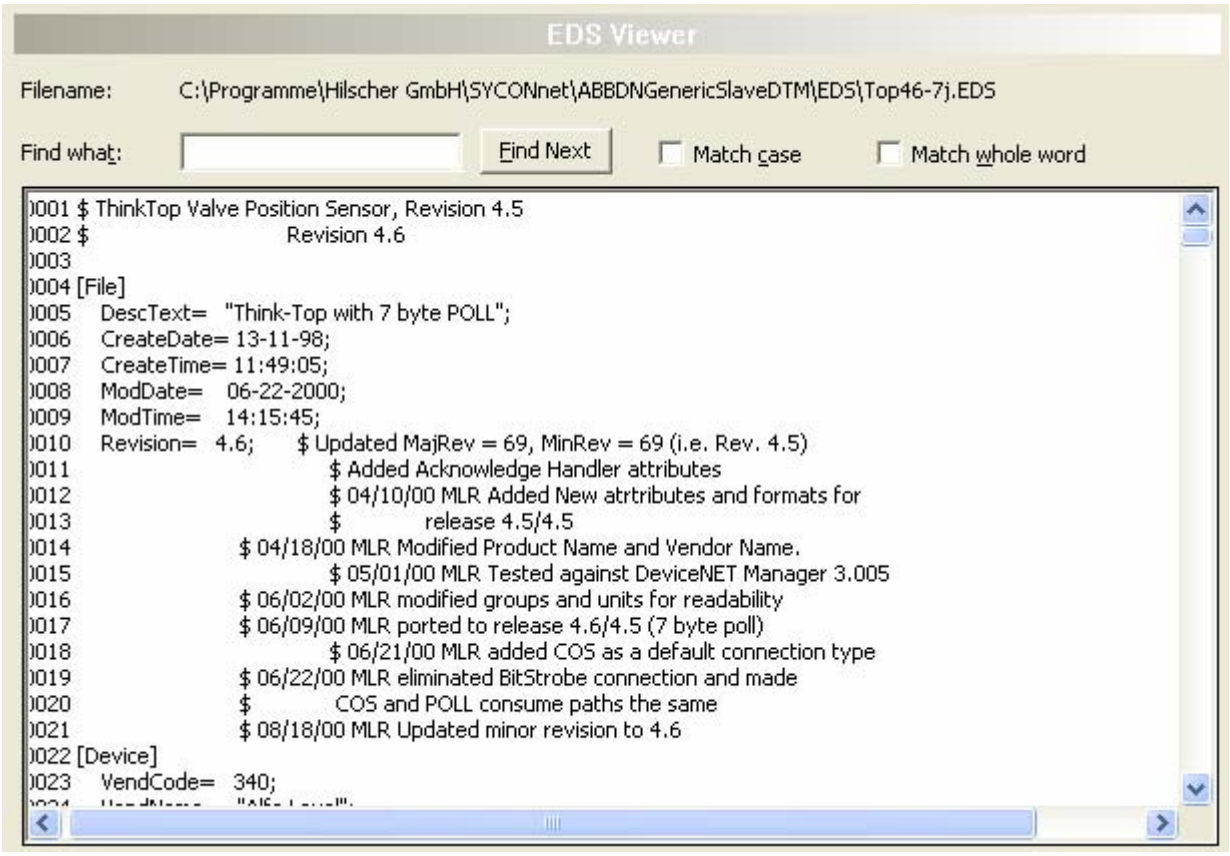

EDS Viewer
Filename: C:\Programme\Hilscher GmbH\SYCONnet\ABBDNGenericSlaveDTM\EDS\Top46-7j.EDS
Find what:
Find Next
Match case
Match whole word
0001 $ ThinkTop Valve Position Sensor, Revision 4.5
0002 $ Revision 4.6
0003
0004 [File]
0005 DescText= "Think-Top with 7 byte POLL";
0006 CreateDate= 13-11-98;
0007 CreateTime= 11:49:05;
0008 ModDate= 06-22-2000;
0009 ModTime= 14:15:45;
0010 Revision= 4.6; $ Updated MajRev = 69, MinRev = 69 (i.e. Rev. 4.5)
0011 $ Added Acknowledge Handler attributes
0012 $ 04/10/00 MLR Added New atrtributes and formats for
0013 $ release 4.5/4.5
0014 $ 04/18/00 MLR Modified Product Name and Vendor Name.
0015 $ 05/01/00 MLR Tested against DeviceNET Manager 3.005
0016 $ 06/02/00 MLR modified groups and units for readability
0017 $ 06/09/00 MLR ported to release 4.6/4.5 (7 byte poll)
0018 $ 06/21/00 MLR added COS as a default connection type
0019 $ 06/22/00 MLR eliminated BitStrobe connection and made
0020 $ COS and POLL consume paths the same
0021 $ 08/18/00 MLR Updated minor revision to 4.6
0022 [Device]
0023 VendCode= 340;

Figure 22: Device Description - EDS

On the left side, the line number is displayed for simple overview, the further entries show the EDS file in text format.

Furthermore under **Filename** the file directory path and the file name of the EDS file is displayed. **Find what** offers a search feature to search for text contents within the text of the EDS file.

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5 Glossary

DTM

Device Type Manager

The Device Type Manager (DTM) is a software module with grafical user interface for the configuration and/or for diagnosis of devices.

EDS

An Electronic Data Sheet (EDS) provides information necessary to access and alter the configurable parameters of a device. An Electronic Data Sheet (EDS) is an file that contains information about configurable attributes for the device, including object addresses of each parameter. The application objects in a device represent the destination addresses for configuration data. These addresses are encoded in the EDS.

FDT

Field Device Tool

FDT specifies an interface, in order to be able to use DTM (Device Type Manager) in different applications of different manufacturers.

MAC ID

The network address of a device serves to distinguish itself on a DeviceNet fieldbus system from any other device or Slave on this network. This should be a unique number for each device.

User Manual

ODMV3 Tray Application

Online Data Manager Tray for Server Control and Diagnosis Access

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ABB STOTZ-KONTAKT GmbH
Eppelheimer Straße 82
D-69123 Heidelberg
Deutschland

Tel.: +49 (0) 6221/701-0

Hotline Tel.: +49 (0) 6221/701-1444
Hotline Fax: +49 (0) 6221/701-1382

Email Hotline: Desst.helpline@de.abb.com

Web: www.abb.de/sto

List of Revisions

Index	Date	Version	Chapter	Revisions
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Although this program has been developed with great care and intensively tested, ABB STOTZ-KONTAKT GmbH cannot guarantee the suitability of this program for any purpose not confirmed by us in writing.

Guarantee claims shall be limited to the right to require rectification. Liability for any damages which may have arisen from the use of this program or its documentation shall be limited to cases of intent.

We reserve the right to modify our products and their specifications at any time in as far as this contribute to technical progress. The version of the manual supplied with the program applies.

All brands and trademarks mentioned in this manual and respectively protected by third parties are unlimited subjected to the regulations of the respectively valid sign and the possession rights of the respective registered owners.

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1 Introduction

1.1 About ODMV3 Tray Application

This manual describes the program **ODMV3 Tray Application** (Online Data Manager Version3 Tray Application).

The **ODMV3 Tray Application** is an additional component of the ODMV3 server and used to control server the functions and for easy access to the server diagnostic program **ODMV3 Diagnostics** diagnostic function. A description of the diagnostics program can be found in the manual **ODMV3 Diagnostics Application.**

The tray application is a Windows EXE program which inserts an ICON in the so called system tray of Windows.

1.2 System Requirements

- PC
- Windows® 2000, Windows® XP
- Windows® 2000: Service Pack 2 or higher
- Free hard disk memory: 2 MByte
- CD ROM drive
- Graphic resolution:
  640 x 480; recommended min. 800 x 600 pixel
- Keyboard and mouse

2 Installation

2.1 ODMV3 Tray Setup und Auto start

The program will be installed during the ODMV3 server installation and automatically started during system start.

If the program is running, it will show its ICON in the so called Windows system tray (menu bar, down on the right side).

Figure 1: System Tray with ODMV3 Tray Application Symbol and Tooltip

3 ODMV3 Tray Symbol Display and Menu

3.1 Symbol Display for the Server State

The ODM server is installable as a Windows system service or as a standard server application (Out-Proc-Server).

Depending on the installation, the tray application will show different states of the server.

Note: The tray ICON is refreshed once per second. If the tray application is not able to determine installation type of the ODM server, the program ICON will be displayed "gray".

The different Icons are used, in the Windows menu bar, to display the actual server state.

Symbol Display Server Status	Description
	- System service not available / installed - Server not running
	- System service stopped
	- System service started, no client connection available - Server started, no client connection available
	- System service running, at least one client connected - Server is running, at least one client connected
	- Server / System service has a warning
	- Server / System service recognized an error

Table 1: ODMV3 Tray Symbol Display

The respective server status is also shown as a tooltip. Therefore the mouse cursor must be moved on top of the program symbol.

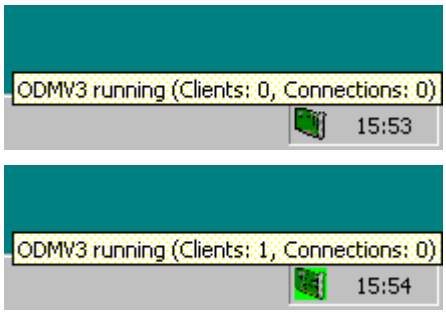

Figure 2: Menu Bar with ODMV3 Tray Application Symbol - Tooltip

3.2 Context Menu ODMV3 Tray Application

The program **ODMV3 Tray Application** is operated by the so called context menu. Depending on the OEM server installation, the options in the context menu are changed.

The context menu can be opened by clicking the program symbol using the right mouse button.

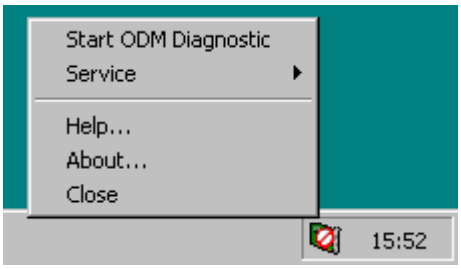

Figure 3: Context Menu ODMV3 Tray Application

The context menu offers the following options:

Option	Description
Start ODM Diagnostic	Starts the diagnostics program **ODM Diagnostics** and allows accessing the ODM server diagnostics functions.
Service	ODM server installed as a system service - Opens the submenu **Start/Stop/Restart**
Terminate Server	ODM server installed as a server - This entry can be used to terminate the server
Help	Opens the on-line help of the tray application
About	Opens the **About** dialog of the tray application and displays the following information: - Vendor and version of the **ODM Tray Application** - Vendor and version of the ODMV3 server
Close	Close the program

Table 2: Options in the Context Menu ODMV3 Tray Application

3.2.1 Control Start-/Stop-/Restart- and Terminate Server Functions

Depending on the ODM server installation, the tray application will offer different functions in the context menu.

Controlling of the **Start/Stop/Restart** functions if the ODM server is installed as a system service. Options are available under the context menu entry **Service**.

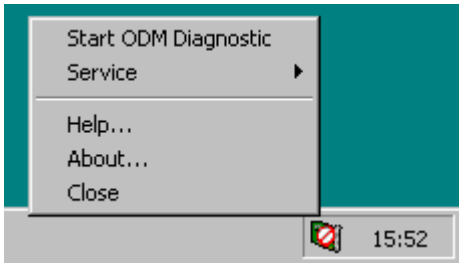

Figure 4: Context Menu ODMV3 Tray Application - Menu Entry Service > Start/Stop/Restat

If the ODM server is installed as an Out-Proc-Server, the option **Terminate Server** can be directly accessed by the context menu entry.

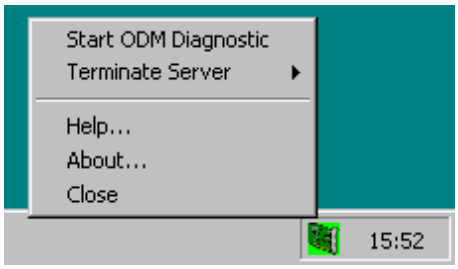

Figure 5: Context Menu ODMV3 Tray Application - Menu Entry Terminate Server

The options **Start/Stop/Restart** and **Terminate Server** are described in the following table:

Option	Description
ODMV3-Server installed as a system service	
Start	Starts the ODMV3 server system service
Stop	Stops the ODMV3 server system service and aborts all active client connections.
Restart	Stops the ODMV3 server system service and starts it again. This will also abort all active client connections
ODMV3 Server installed as an Out-Proc-Server	
Terminate Server	Terminates the server program and aborts all active client connections

Table 3: Options in the Context Menu ODMV3 Tray Application - Start/Stop/Restart and Terminate Server

Attention: Stopping the server will abort all active client connections.

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User Manual

ODMV3 Diagnostics Application

Online Data Manager Diagnostic Function

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ABB STOTZ-KONTAKT GmbH
Eppelheimer Straße 82
D-69123 Heidelberg
Deutschland

Tel.: +49 (0) 6221/701-0

Hotline Tel.: +49 (0) 6221/701-1444
Hotline Fax: +49 (0) 6221/701-1382

Email Hotline: Desst.helpline@de.abb.com

Web: www.abb.de/sto

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Although this program has been developed with great care and intensively tested, ABB STOTZ-KONTAKT GmbH cannot guarantee the suitability of this program for any purpose not confirmed by us in writing.

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1 Introduction

1.1 About ODMV3 Diagnostic Application

This manual describes the program **ODMV3 Diagnostic Application** (Online Data Manager Version3 Diagnostic Application).

This program is an additional component of the ODMV3 server and used to display and analyse server information, server errors, driver errors, client connections and the data transfer between the ODM server and ODM drivers.

The **ODM Diagnostics Application** is a stand-alone Windows program.

1.2 System Requirements

- PC
- Windows® 2000, Windows® XP
- Windows® 2000: Service Pack 2 or higher
- Free hard disk memory: 2 MByte
- CD ROM drive
- Graphic resolution:
  640 x 480; recommended min. 800 x 600 pixel
- Keyboard and mouse

2 Installation

2.1 ODMV3 Diagnostics Installation and Startup

The program will be installed during the ODMV3 server installation.

It can be started from the **ODMV3 Tray Application**.context menu, which offers the menu option **Start ODM Diagnostic**.

A decription of the **ODMV3 Tray** application can be found in manual **ODMV3 Tray Application**.

3 Program and Dialogs

3.1 Program and Dialogs

The diagnostics program **ODM Diagnostics** offers the following functions:

- Displaying of server/driver errors and trace messages
- Displaying of server/driver internal messages and error counters
- Displaying the message transfer between server and drivers

The program dialog is divided into three different areas:

- Program menu (on top)
- Selection of the diagnostics information by using the tree structure at the left side of the dialog
- Display of the diagnostics information at the right side of the dialog

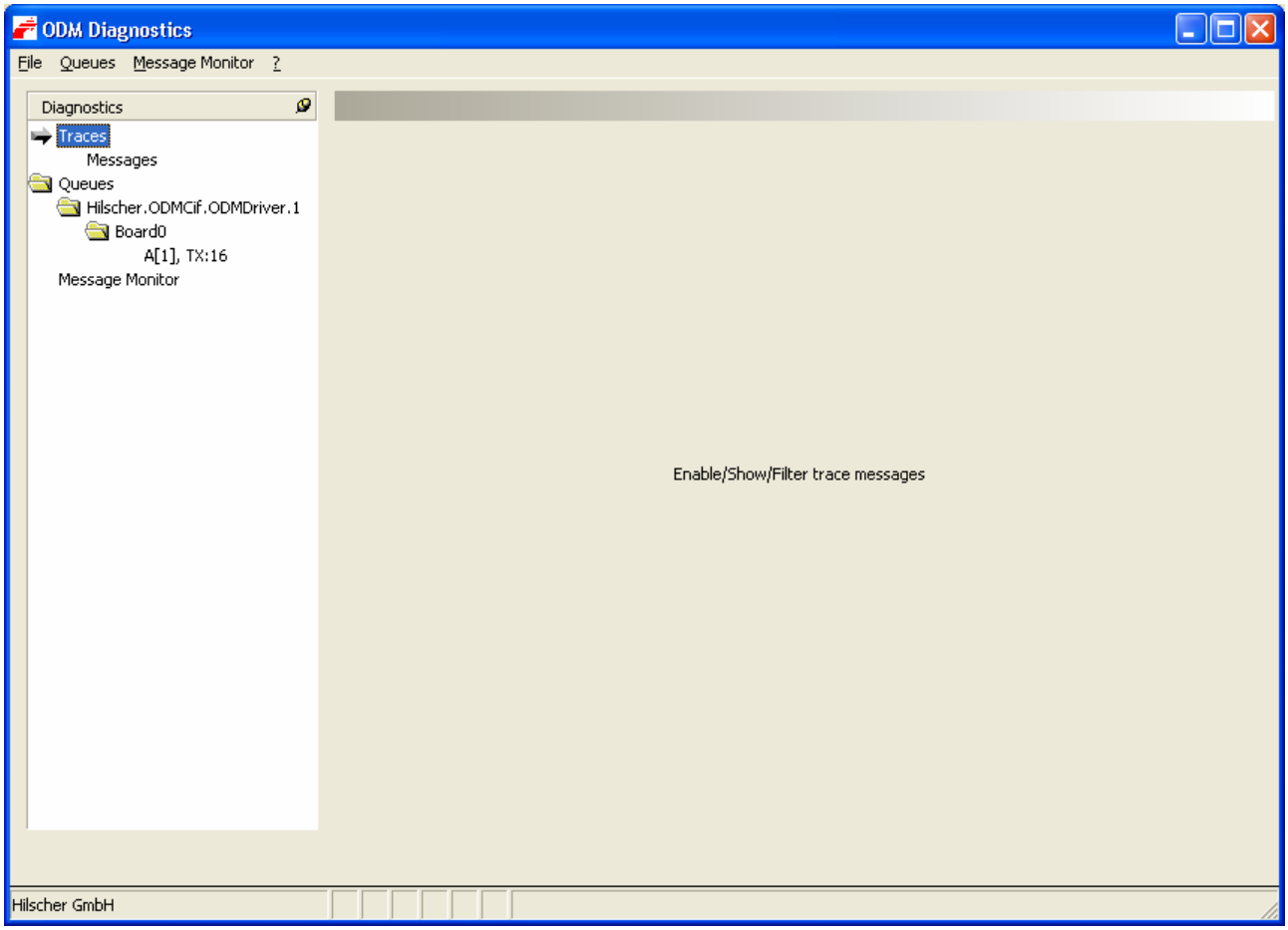

Figure 1: ODM-Diagnostics Dialog - ODM Diagnostics

3.2 Program Menu

The following options can be found in the program menu:

- File
- Queues
- Message Monitor
- ?

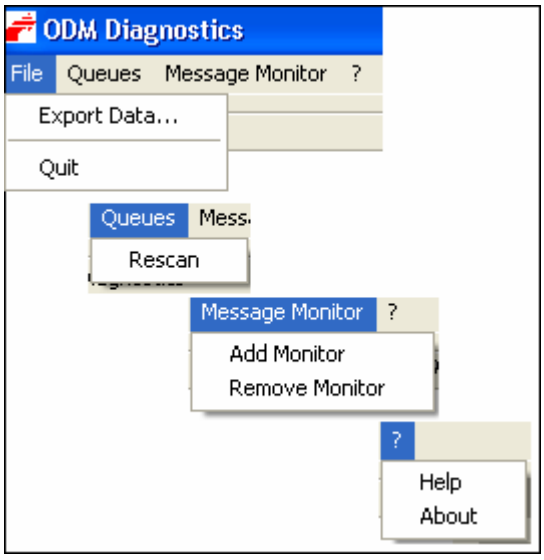

Figure 2: ODM-Diagnostics Menu - File / Queues / Message Monitor / ?

3.2.1 Option - File

The menu option **File** offers the following entries:

- **Export Data...**
  Allows to save the recorded program data into a XML file. A file dialog will be opened to define the target file.
- **Quit**
  Closes the program

3.2.2 Menu Option - Queues

Queues are internal memory blocks of the server and driver. These exist only if a client application has opened a connection to a device.

The diagnostic program has no function that detects automatically queues, that are opened or closed after the start of the diagnostic. The current queue information are read again from the ODM server with **Rescan**.

- **Rescan**
  Read the current queue information from the ODM server.

3.2.3 Option - Message Monitor

Via the **Message Monitor**, the data transferred between the ODM server and an ODM driver can be recorded.

Therefore a client application must have an active connection to a specific device. On such a connection, a monitor can be activated..

- **Add Monitor**

Opens a dialog with all dives having an active client connection.

Figure 3: Selection Dialog - Select Device

Clicking **OK** will select the chosen device and creates a new entry in the tree view.

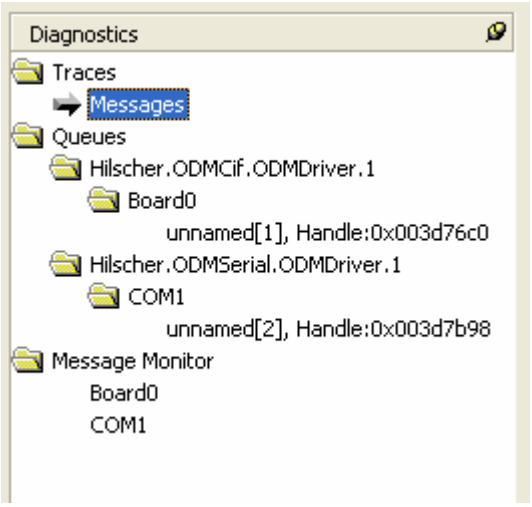

Figure 4: Tree View structure for diagnostic functions - Message Monitor

Message data are displayed by selecting an entry under the tree view option **Message Monitor**.

- **Remove Monitor**

Removes the selected monitor entry from the tree view and closes the monitor function on the related connection.

3.2.4 Option - ?

The menu option **?** allows to choose the **Help** undo **About** dialog.

- **Help**

Opens the program online help

- **About**

Opens the dialog to display the program versions

4 Monitor Functions

4.1 Trace Message Monitoring

The ODM server offers the possibility to store error and trace messages, of the server components (e.g. ODM drivers), during runtime.

These information messages are stored by the server into a circular buffer offering a pre-defined number of 100 entries. The diagnostics program is able to read and display these entries. If the ODM server is not running, it will be started by the diagnostics application. But the application will not create any active client connection.

The trace dialog is opened by the tree view option **Traces**. While the number of stored trace entries can be adjusted using the entry **Buffersize**.

To open trace monitor, select the option **Traces -> Messages** from the tree view dialog.

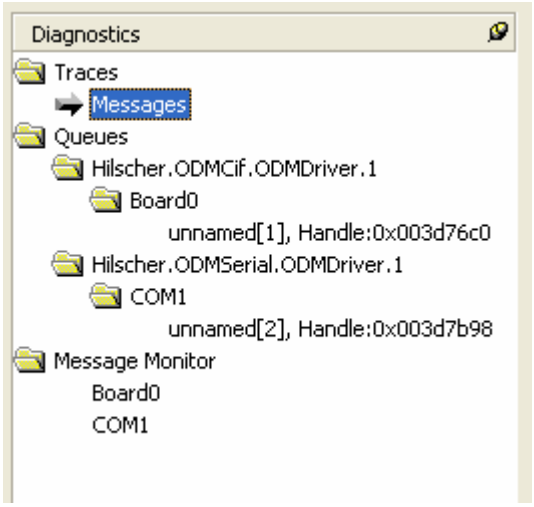

Figure 5: Tree View structure for Diagnostic Functions -Traces Messages

On the right side of the program, the following dialog will be shown:

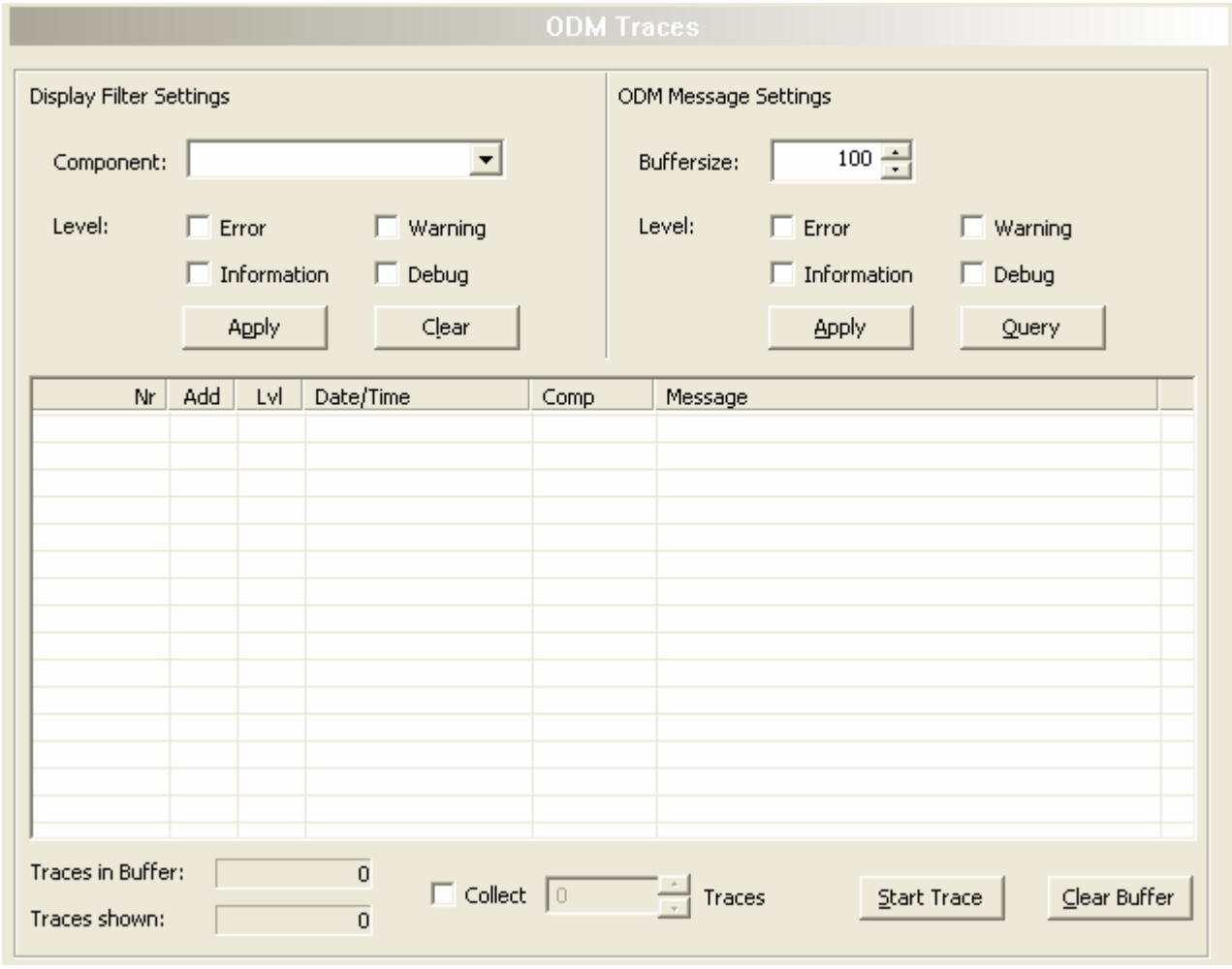

Figure 6: ODM Trace Dialog

- **Display Filter Settings**

This setting refers to received messages. **Display Filter Settings** can be used to display component (driver) specific messages. New settings are activated by clicking **Apply**. **Clear** will delete the previous settings

Note: The **Component** selection will only offer ODM server standard components. It is also possible to insert component names directly via the keyboard.

Possible settings:

Option	Description
Component	Select the component to display messages for. (e.g. “ODMCif”)
Level	Select a trace level. This will display all messages sent with the given level. **Attention:** If the trace output for the filtered level is not activated no trace output will be shown.

Table 1: Possible Settings - Display Filter Settings

- **ODM Message Settings**

Trace settings must be repeated after each program startup, because the servers default setting is "no trace recording".

If the diagnostic program is started, the option **Query** can be used to read the actual **ODM Message Settings**.

Following settings are possible:

Option	Description
Buffersize	Sets the number of messages to be saved for later retrieval.
Level	Defines the trace levels to be activated.

Table 2: Possible Settings - ODM Message Settings

- **Display and handling of the Trace Message Dialog**

The trace message dialog is used display the ODM server trace messages. In here, all or only the filtered messages are shown.

Start Trace activates the reception of messages and all server stored messages are displayed first. All messages, read from the server are stored in the diagnostics program. for later access or filtering.

Clear Buffer deletes the program internal message buffer.

- **Traces in Buffer**

This value displays the actual number of messages in the programs message buffer.

- **Traces shown**

Displays the number of messages actual shown or filtered.

4.2 Queue Monitoring

Both the ODM server and the ODM drivers are using an internal message buffers. Each of these buffers are containing message counters and they are readable by the diagnostics application.

The counters can be displayed by selecting **Queues** from the tree view. But counters are only available, if there are client connections active on the server.

Queue information is only read during the startup of the application. The menu option **Queue->Rescan** can be used to read the actual queue information.

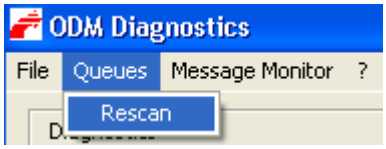

Figure 7: Menu Option- Queues -> Rescan

Note: Queues, which are observed by the diagnostic program, are not closed while the corresponding client application is closed. This happens only if **Queue->Rescan** is used or the diagnostic program is closed.

Example of the tree view queue entries.

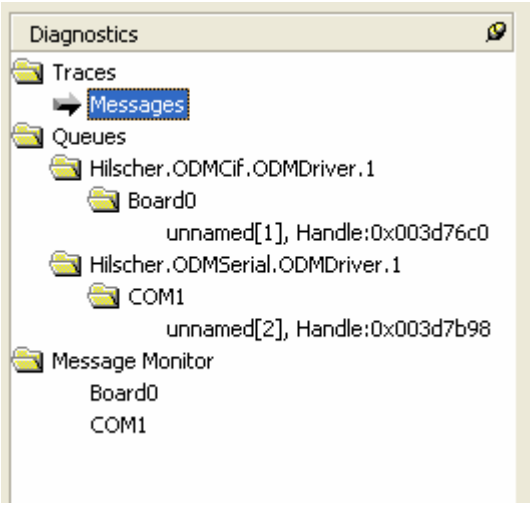

Figure 8: Tree View Function - Queues

Queue information is display on the right side of the program.

Display of the message counters between server and driver

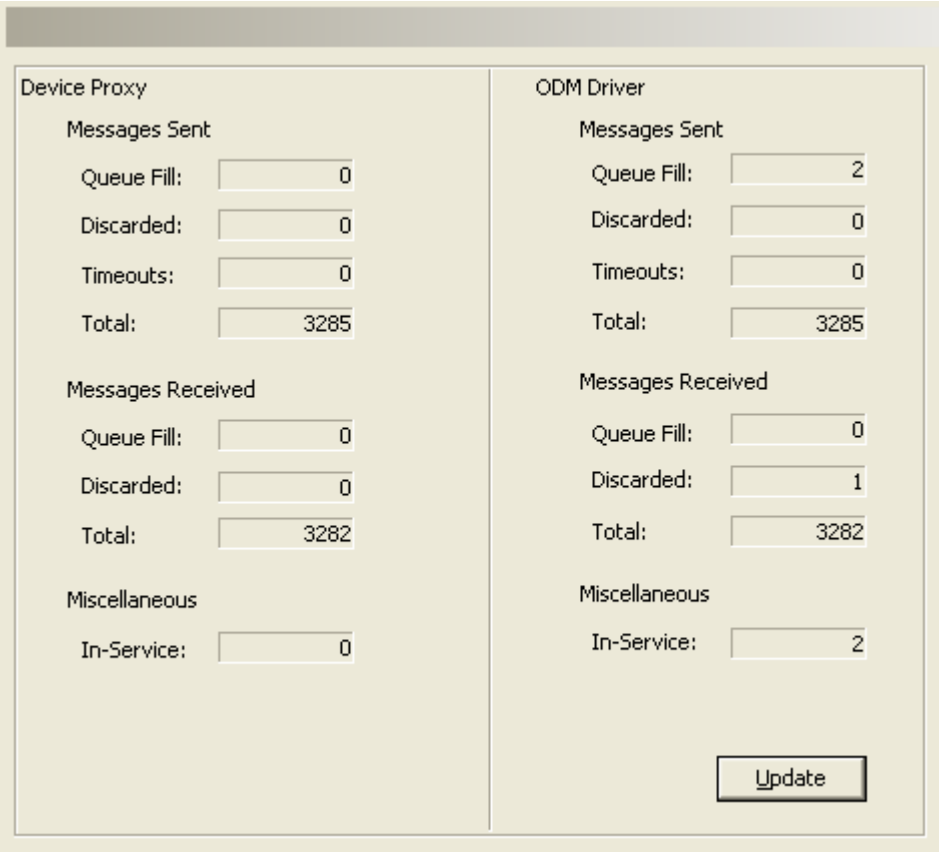

Figure 9: Display of the Global Device Message Counters

This dialog will display the message counters per device and is updated once a second.

Update can be used for manually updating the display.

Display of the message counters per client connection

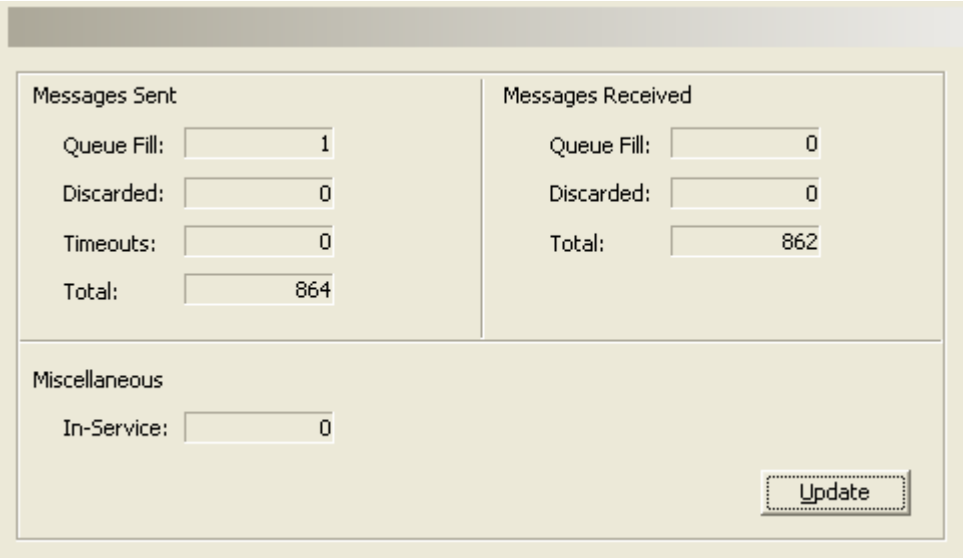

Figure 10: Display of the Message Counters per Client Connection

This dialog will display the message counters per client connection and is updated once per second.

Update can be used for manually updating the display.

Description of the queue counter values:

Send		
	Value	**Description**
	Queue fill	Fill level of send queue
	Discarded	Number of send messages that were discarded / not sent.
	Timeouts	Number of timeouts during sending
	Total	Total number of processed send messages
Receive		
	Value	**Description**
	Queue fill	Fill level of receive queue
	Discarded	Number of send messages that were discarded (not matching a command)
	Total	Total number of processed received messages
Miscellaneous		
	Value	**Description**
	In-Service	Messages currently active on the device

Table 3: Description of the queue counter values

4.3 Message Monitoring

Also the messages transferred between the ODM server and an ODM driver can be observed by the diagnostic application.

Therefore the option **Message Monitor** can be used. Like monitoring queues, a message monitoring also assumes active client connections to a hardware device.

A monitor can be opened by the menu option **Message Monitor** choosing **Add Monitor**.

Figure 11: Menu Option - Message Monitor -> Add Monitor

This will open the **Select Device** dialog which offers all currently active device connections.

Figure 12: Selection Dialog - Select Device

OK selects the current selection.

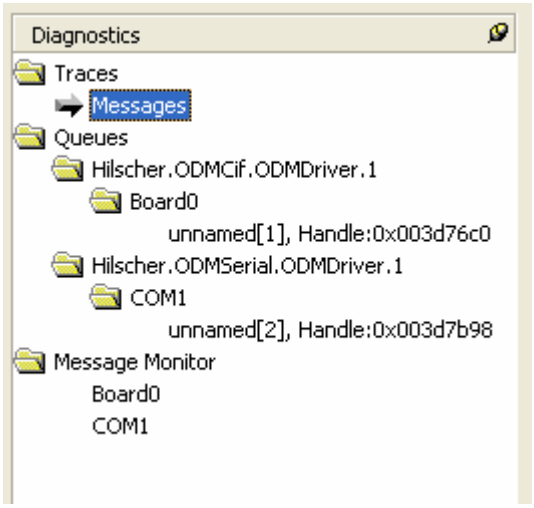

Figure 13: Tree View - Message Monitor

After selecting a connection, a corresponding entry in the tree view dialog will be generated.

Choosing a monitor from the tree view dialog, the following dialog will be opened on the right hand side of the program:

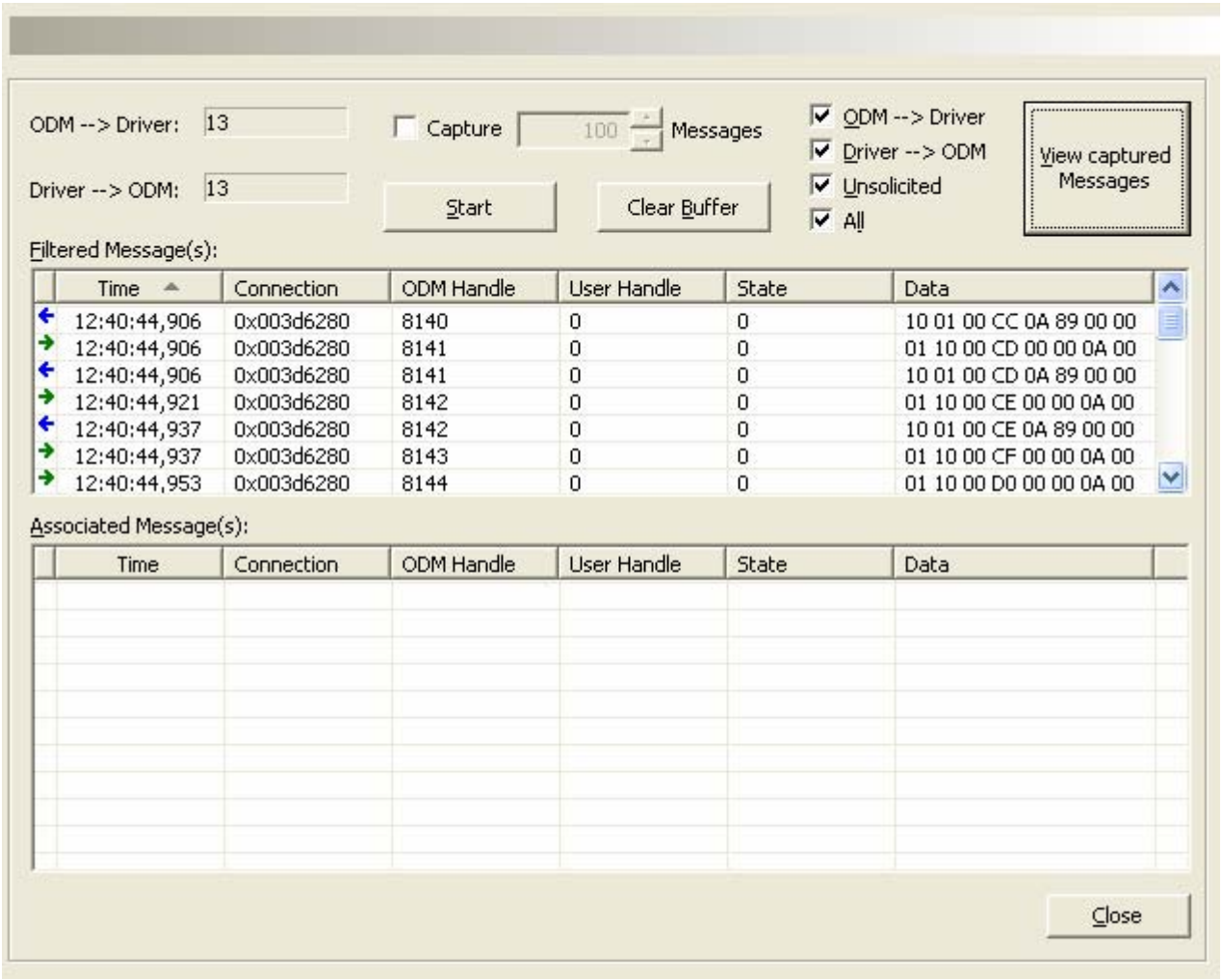

Figure 14: Display of recorded Messages

Display of recorded messages

This dialog shows all messages exchanged between the server and a driver. Command messages send by the server down to a driver are marked with a right arrow "**->**". Answer messages from a driver are marked by a left arrow "**<-**".

Command messages (so called unsolicited messages) send from a driver to the server are marked with "**S<-**". Corresponding answer messages, created by a server application, are marked with "**S->**".

- **Stop/Start**
  Terminate or begin of the message recording
- **Clear Buffer**
  Deletes all previously recorded messages
- **Capture**
  Activates the message recording until the given number of messages reached.

Note: The diagnostic program will record messages until no more system memory available. This can lead into a blocking PC system. **Capture** allows to define the maximum number of messages which should be recorded..

- **View captured Messages**
  Message recording is always processed in the background of the application. Use the **View captured Messages** button to display the recorded messages. The option selection **ODM -> Driver**, **Driver -> ODM**, **Unsolicited** and **ALL** defines which messages are displayed.

Note: Depending on the number of recorded messages, the update of the display dialog can take a long time.

- **Close**
  Stops the message recording and closes the corresponding monitor.

Display message content

The content of a recorded message can be shown by double clicking on the a messages entry in the message dialog.

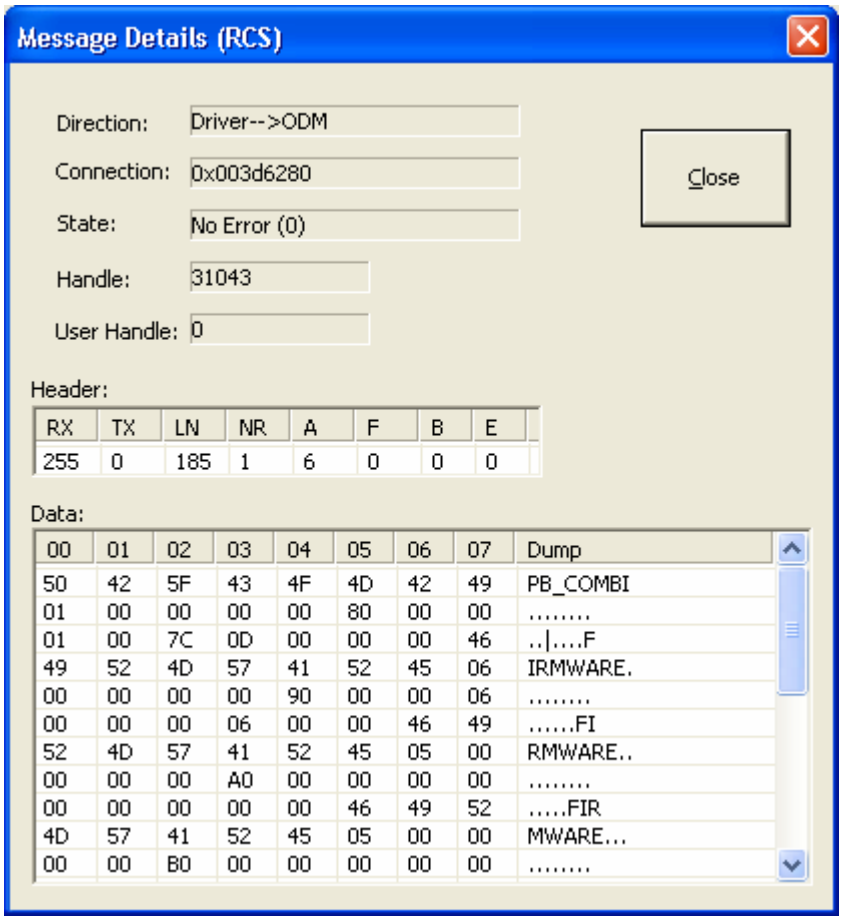

Figure 15: Display the Content of a Recorded Message

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ODMV3

Online Data Manager Version 3

ODMV3 Diagnostic Application

ODM server diagnostic application

ODMV3 Tray Application

ODM server tray application

Operating Manual

netConnect

Connection Tool between PLC Program System and Bus Configurator

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ABB STOTZ-KONTAKT GmbH
Eppelheimer Straße 82
D-69123 Heidelberg
Germany

Tel.: +49(0)6221/701-0

Hotline Tel.: +49(0)6221/701-1444
Hotline Fax: +49(0)6221/701-1382

Email Hotline: Desst.helpline@de.abb.com

Web: www.abb.de/sto

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1 Introduction

1.1 About this Manual

This manual describes the use of the software component **netConnect** as a connection tool between a PLC project and a bus configuration.

1.2 Legal Notes

1.2.1 Disclaimer

Although this program has been developed with great care and intensively tested, ABB STOTZ-KONTAKT GmbH cannot guarantee the suitability of this program for any purpose not confirmed by us in writing.

Guarantee claims shall be limited to the right to require rectification. Liability for any damages which may have arisen from the use of this program or its documentation shall be limited to cases of intent.

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1.3 About netConnect

1.3.1 Connection Tool netConnect

netConnect is a connection tool, integrated in SYCON.net, between a PLC Project and a bus configuration and it connects the **variables** of the PLC project with the input and output data (**signals**) of a bus configuration.

netConnect Functions

The connection tool **netConnect** contains the following functions:

- **Creating** and **connecting** a PLC variable with a signal
- **Sort** signals by the name, data type or by the name of the connection with the aid of the table view
- **Find** a certain signal
- **Delete** a PLC variable (connection)
- **Setting the driver parameter** for the Master
- **Changing** the **name** of a PLC variable (connection)

Conditions

It is necessary that a project is created in the **bus configuration** of the frame application and that this project contains configured **input and/or output data** of a Slave.

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2 Representation in netConnect

2.1 netConnect Structure

netConnect contains two views:

- Representation of the bus configuration as **project tree [1]**
- Representation of the input and output data (signals) in a **table [2]**

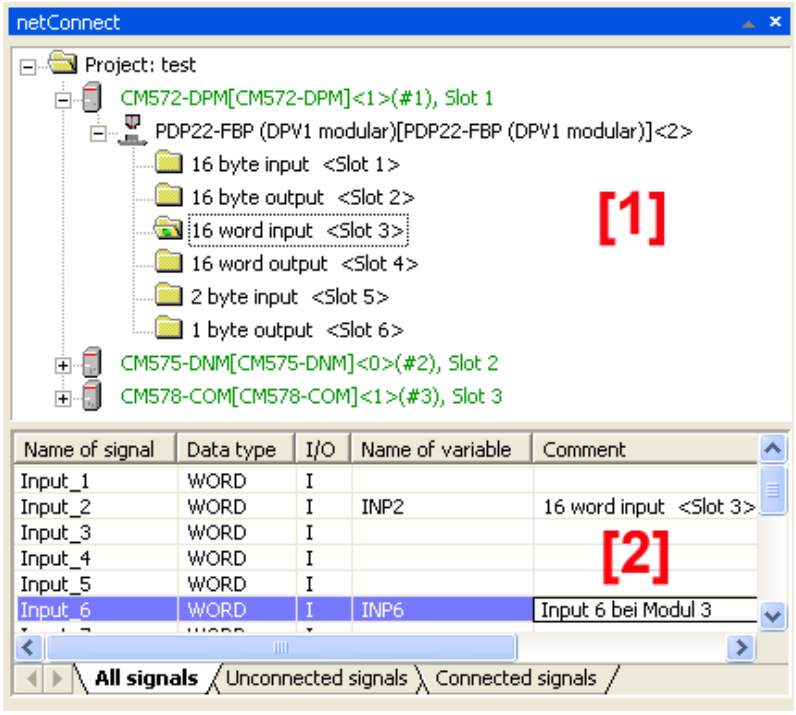

Figure 1: netConnect structure - Representation in netConnect

Project tree [1]:

The **bus configuration** is a master system, represented as a project tree. Within a bus configuration one or more master systems can be present. The representation depends on the provided bus configuration and can vary.

In the project tree of the master system one or more Slave device(s) can be defined. Depending from the fieldbus type in the configuration of the Slave modules with **input and output data** (signals) or the connection type needs to be configured. The defined **I/Os** or the connection type is only valid for the respective master system and they are indicated as **folders**. The folder name corresponds to the module name including the module position or the name of the connection type.

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Table [2]:

The **signals** of the actual selected signal folder are listed tabular underneath the project tree of the bus configuration.

The column **signal name** indicates the names of the configured signals. Signals are the input and output data, which are assigned with the module configuration of the Slave device. A tilde **~** before the signal name shows that this signal was split in its bits/bytes. Detailed information about split signals can be found in section *Split Connection* on page 17*.*

In the column **data type** the data type for each signal is indicated. Further information about this you find in section *Connecting Data Types* on page *14.*

The column **I/O** indicates whether the signal is input or output data.

If this signal is linked with a variable, the name of the connected variable is displayed in the column **Name of Variable**.

In the column **Comment** for signals with a connected variable the module name including the module position or the name of the connection type is displayed. Furthermore the comment field is editable (see section *Editing Comment* on page 17).

2.1.1 Register Maps

Figure 2: Register Maps

The presentation of the variables and/or signals can be filtered by the **register maps** below the tables. Depending on the activated register map

- all signals,
- all unconnected signals or
- all connected signals

are indicated.

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2.2 Context Menus

By a right mouse click the **context menu** of the selected **signal** opens. Alternatively the **context menu** can be called also with the combination of keys **SHIFT + F10**, if a signal is selected.

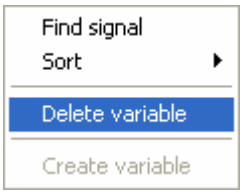

Figure 3: Context menu

Menu option	Meaning
Find signal	With the menu option **Find signal** can be looked for an appointed signal. This function is described in the section *Find Signals* on page *23*.
Sort	With this function the signals of the bus configuration project can be sort according to the **Signal name**, **Data type** or according to the **Name of the connection**. You find a description for sorting in section *Sort Signals* on page *24*.
Delete variable	The function **Delete variable** removes the linage between the variable and the signal and erases the variable. This is described in section *Delete Variable* on page 20.
Create variable	The function **Create variable** links a signal, while netConnect creates a variable for this signal. A detailed description about this can be found in section *Automatic Creating and Connecting* on page *13*.

Table 1: Context menu

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3 Working with netConnect

3.1 Create Connection

There are two possibilities to create a connection:

- **Enter a variable manually**

By a double click into the column **Name of Variable** or by selecting a cell in the column **Name of Variable** and clicking the SPACE key activates the input box.

A name for the variable, which is to be created, can be entered in this field. More information about creating a connection by entering a variable name manually can be found in section *Enter a Variable manually* on page 12.

- **Automatic Creating and Connecting**

The context menu of the signals in the bus configuration contains the menu function **Create variable**. For the selected signal a variable is produced and linked directly by selection of this option. A detailed description about this you find in section *Automatic Creating and Connecting* on page *13*.

Indication of a connection:

In case of successful connection the representation of the bus configuration changes. Further information about the indication of a connection is des described in section *Representation of an existing Connection* on page *19*.

Connect different data types:

It is possible to connect signals and variables with different data types. But the data types which can be linked must be compatible. A detailed description about this can be found in section *Connecting Data Types* on page *14.*

Note: If a variable is assigned to a signal with **input data**, then these data can be **only read**. If a variable is assigned to a signal with output data, then these data can be read and written.

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3.1.1 Enter a Variable manually

By a double click into the column **Name of Variable** or by selecting a cell in the column **Name of Variable** or by pressing the F2 key and clicking the SPACE key activates the input box.

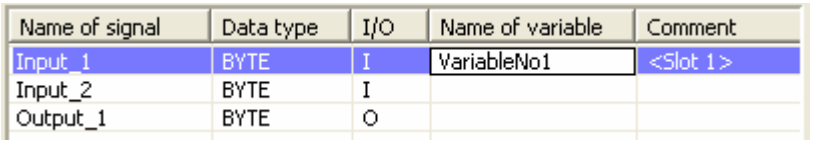

Figure 4: Enter a Variable manually

Then a name for the variable, which is to be created, can be entered in this field.

With **ENTER** and/or **TAB** key or with a focus change this entry is confirmed and the connection is created. This entry can be canceled with the **ESC** key when the entry is not confirmed yet.

If the entry was successful a new variable with the data type of the appropriate signal is created and connected to the signal.

Possible input data errors:

With the manual entering of the variable name the following errors can occur:

- Variable with this name is already existing
- Invalid characters (permitted are all letters, digits and '_')
- Multi repetition of '_' or '_' at the beginning or at the end of the variable name
- A digit as first character is not permitted
- Space character

Further netConnect functions are blocked in case of an input data error and the input data error is marked red until this entry is corrected or canceled.

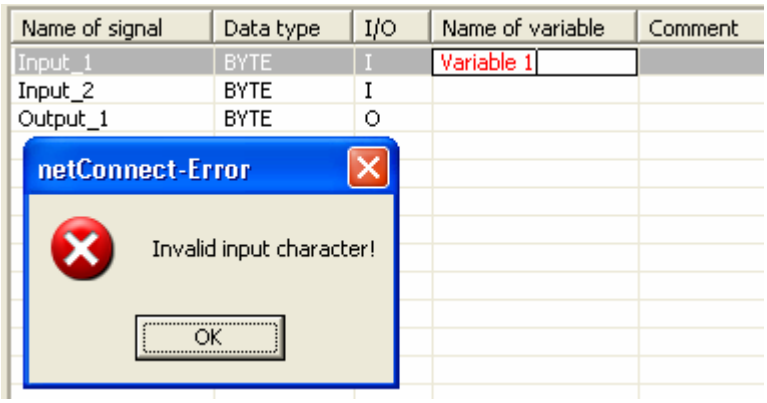

Figure 5: Input data error (invalid space character)

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3.1.2 Automatic Creating and Connecting

With the function **Create variable** (by selecting a cell in the column **Name of Variable** and clicking the **Insert** key) netConnect links a signal with a variable by providing a new variable for the selected signal.

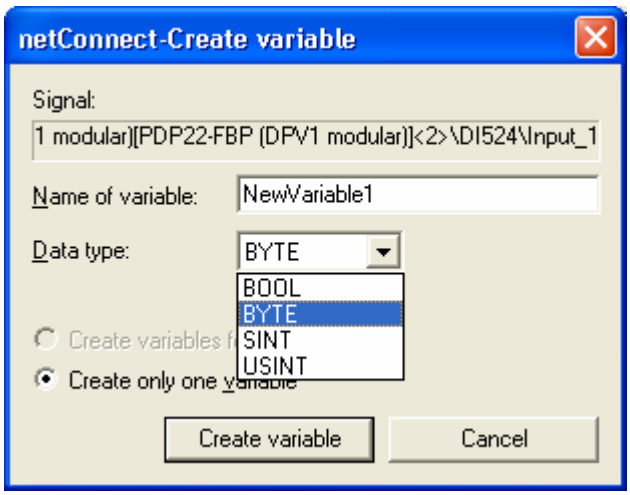

Figure 6: Create and Connect

- **Signal**

This row indicates the path of the selected signal.

- **Name of the variable**

The name for the new created variable is displayed in the input field Name of variable and can be edited here.

- **Data type**

The data type for the new created variable is adjusted in the selection field data type. Further information for this is described in section in section *Connecting Data Types* on page *14*.

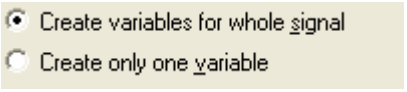

Figure 7: Create variable

In this section it is selected whether an individual variable is created for this signal, or whether several variables for the whole signal are provided.

If several variables for this signal are produced, the signal is split in its individual bytes/bits.

Selecting the option **Create only one variable**, maybe a bit/byte of the signal must be selected with which the created variable is linked. This depends on the data type.

Further information about this you find in section *Split Connection* on page 17.

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3.1.3 Connecting Data Types

Connecting signals and variables it is distinguished between two different connection possibilities of data types:

1. Simple Connection

A simple connection is a connection of same data types and it is done via a keyboard entry or via the context menu, how described in section *Create Connection* on page *11*.

In case of a multi-byte signal no 1to1 connection can be created, as no data types of the same size are defined in the SPS. For a connection therefore the next larger data types needs to be selected.

Bus: Multi-byte-Signal in bit	SPS: Data Type in bit
24	32
40	64
48	64
56	64

Table 2: SPS Data Types for multi-byte Signals at the Bus

The following data types are defined as own data type MULTI-BYTE:

signed24, unsigned24, signed40, unsigned40, signed48, unsigned48, signed56, unsigned56,

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2. Split Connection

A **split connection** is a connection of two data types with different bit size, whereas the bit length of the signal is bigger than the length of the variable. Not the whole signal is connected with a variable, but only individual bits/bytes of this signal. A detailed description about this can be found in section *Split Connection* on page 17*.*

Note: When connecting different data types these are examined for their compatibility. A connection is only possible if data types which should be connected are compatible. Otherwise the connection cannot be created.

Connecting criteria are the bit size and the algebraic sign of the connecting data types. In the following table default connecting criteria are displayed:

		Bus Signal					
		Bit Sequence		Unsigned		Signed	
		1 to 1	Split to	1 to 1	Split to	1 to 1	Split to
SPS Variable	Bit Sequence	X	X	X	X	X	X
	Unsigned	X	X	X	X		
	Signed	X	X			X	

Table 3: Default connecting Criteria for different Data Types

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SPS Data Types

The following table gives an overview of the elementary SPS data types and their range of value:

Key Word	Explanation	Bits	Range of Value
BOOL	single bit	1	TRUE, FALSE
BYTE	one byte	8	single bit sequence
WORD	one word	16	single bit sequence
DWORD	one double word	32	single bit sequence
LWORD	one long word	64	single bit sequence
SINT	short Integer	8	-128…+127
INT	Integer	16	-32768…+32767
DINT	double Integer	32	-2147483648… +2147483647
LINT	long Integer	64	-2^63...+2^63 -1
USINT	unsigned short Integer	8	0…255
UINT	unsigned Integer	16	0…65535
UDINT	uns. double Integer	32	0…4294987295
ULINT	uns. long Integer	64	0…2^64 - 1
REAL	real numbers	32	1,18x10^-38… 3,40x10^38
LREAL	long real	64	
DATE_AND_TIME	Date and time		
DATE	date		
TIME_OF_DAY	Day time		
TIME	time period		
STRING	text string		

Table 4: Elementary Data Types

Bus Data Types

The following “universal” elementary data types can be used for any bus system:

bit, byte, signed8, unsigned8, word, signed16, unsigned16, signed24, unsigned24, dword, signed32, unsigned32, signed40, unsigned40, signed48, unsigned48, signed56, unsigned56, lword, signed64, unsigned64, real32, real64, string, wstring.

These data types also can appear as arrays.

Arrays

For an ARRAY several elements of the same data type are combined into a field.

In the bus configuration an identifier for the data type of the type ARRAY is arranged as follows:
[Core data type][_][ARRAY][_][Number of elements].

E. g. **BYTE_ARRAY_16** means, that it is an Array of 16 Bytes. **SIGNED16_ARRAY_9** e. g. means, it is an Array of 9 "Signed16" elements.

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3.1.3.1 Split Connection

A **split connection** is a linkage of two data types with different bit size. Not the whole signal is linked with a variable, but only individual bits/bytes of this signal.

With creating such a connection a dialogue opens, in which the position of the bit/byte which can be linked must be selected.

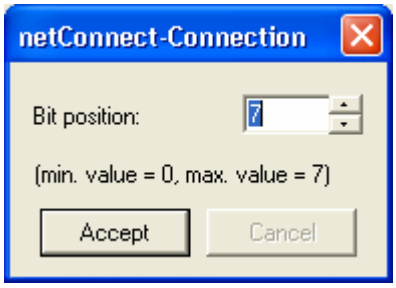

Figure 8: Select position for connected bit

After the selection of the bit/byte and confirmation by clicking the **Accept** switching surface the signal is split into the individual bits/bytes and the connection to the selected bit/byte is created.

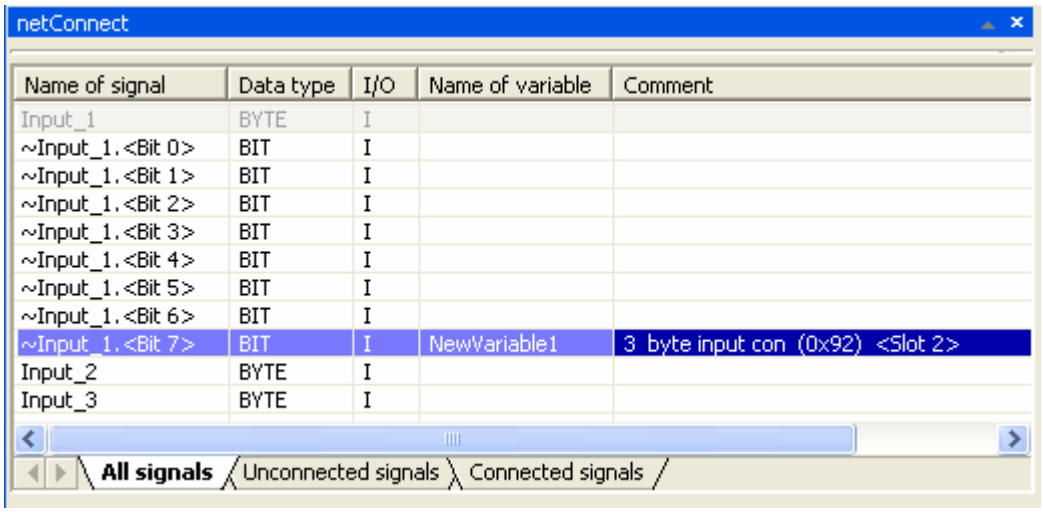

Figure 9: Split signal

The individual bits/bytes of the split signal are listed in the table below the signal name and each bit/byte and is represented in an own line. The individual bits/bytes are characterized by a **tilde (~)** in front of the signal name and the addition **<Bit X>** or respectively **<Byte X>** in the end of the signal name.

The **designation of the split signal** is grayed out and so it is **write protected**, because now the entire signal cannot be linked anymore, because individual bits/bytes of it are already connected.

Further bits/bytes of this signal can be linked now by editing and/or via the context menu, without the dialogue appears for selecting the bit/byte which should be connected.

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Characteristics with Arrays

Arrays are already represented in the netConnect signal table as split array core elements.

The connections are created by the usual procedure. If no connection is created for an array signal, via right-click on the main line of the array signal and the context menu/**Create variable** for all array subsignals variables of the same type are created.

The simple elements of array are marked by a simple **tilde (~)** before the signal name, those subelements split up further are marked by a double **tide (~~)**.

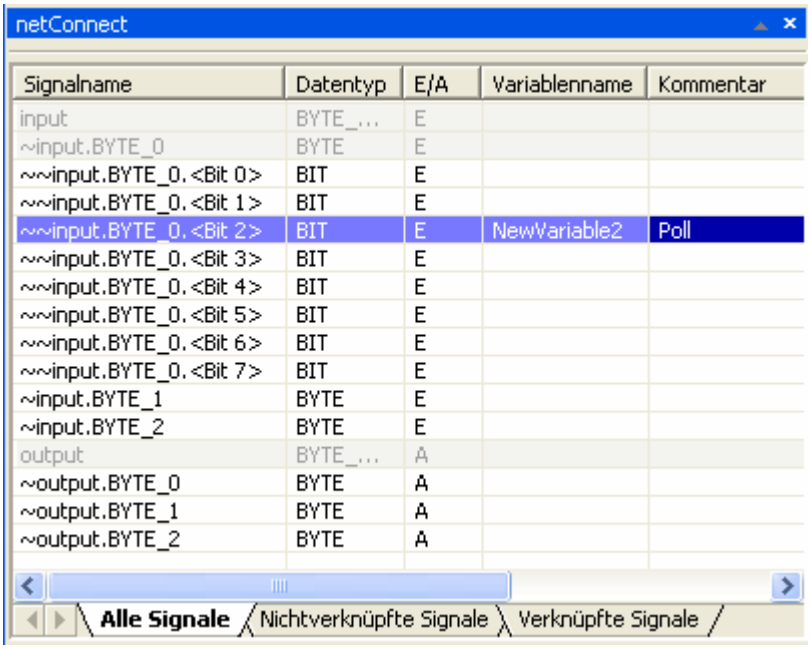

Figure 10: Split signal – Example for Array

Deleting a spilt connection

The indication of the split connection is closed again and the individual bits/bytes are not indicated any longer, when deleting the last connection bit/byte.

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3.1.4 Representation of an existing Connection

An existing connection is represented by different characteristics. How to create a connection is described in section *Create Connection* on page *11*.

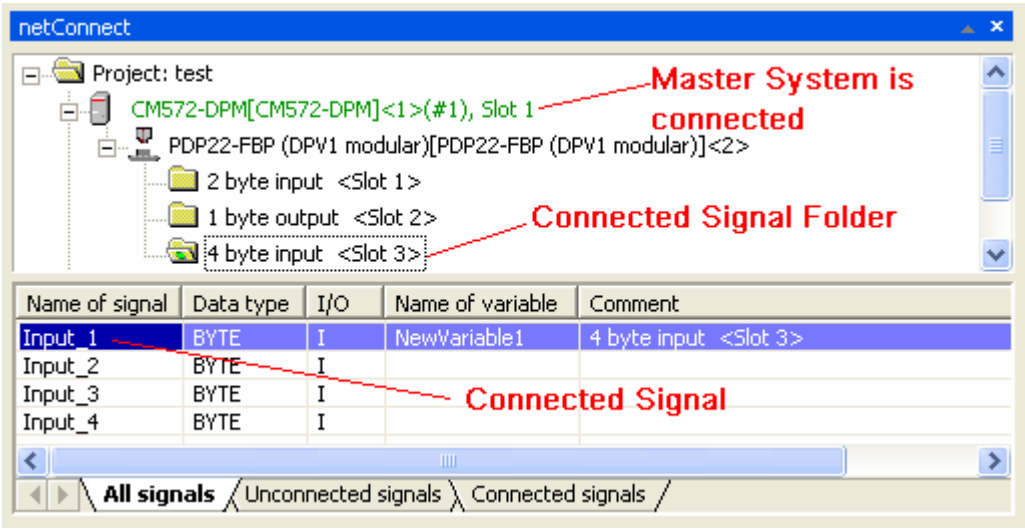

Figure 11: Representation of a connection

Representation of the Master System

In case of an existing connection the **Master System** is displayed green.

Representation of the Signal Folder

Note: Folders, which contain connected signals, are characterized by a green point on the signal folder.

Folder-Symbol	Description
	The signals folder is not selected, and no signals of this folder are connected.
	The signals folder is selected, but no signals of this folder are connected.
	The signals folder is not selected, but signals of this folder are connected.
	The signals folder is selected, and signals of this folder are connected.

Table 5: Representation of the signal folder

Representation of a Variable in the table

The name of the connected variable is shown in the column **Name of Variable**.

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3.2 Delete Variable or Connection

To delete a variable first the connection which should be deleted needs to be selected. The connection and the variable are deleted with one right-click into the row of the connection and selecting **Delete variable** in the context menu.

Alternatively the connection and the variable can be deleted also via the **Delete** key. Therefore a cell in the column **Name of Variable** needs to be selected.

After deleting the last existing connection the master system and the signal folder are not longer displayed green.

Figure 12: Delete variable

Variables and connections of:

- Masters,
- Slaves,
- Modules,
- Signals,
- Splitted Signals,

each can be deleted as own variable subset. Therefore the corresponding elements in the project tree of netConnect or in the table as well as the command **Delete all variables** or **Delete variable** needs to be selected. (See table *Deleting Variable Subsets* on page 21.)

Note: If the variables of a splitted signal are deleted, any variables of the signal which has been splitted are deleted.

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Deleting Variables of Master, Slave, Module, Signal or splitted Signal

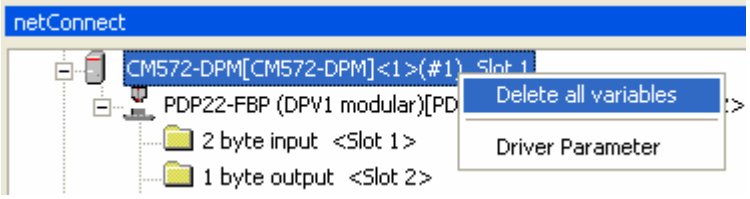
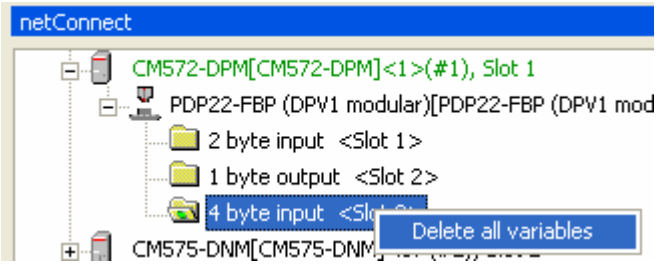
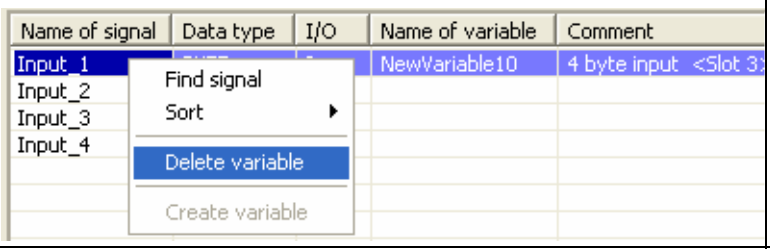
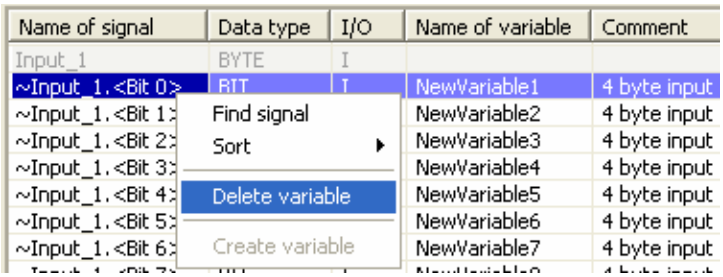
Context Menu „Delete all variables“ or „Delete variable“	Yes / No Request „netConnect-Connection“
Master: 	Do you really want to delete all variables of “CM572-DPM[CM572-DPM]<1>(#1), Slot 1“?
Slave: 	Do you really want to delete all variables of “PDP22-FBP (DPV1 modular)[PDP22-FBP (DPV1 modular)]<2>“?
Module: 	Do you really want to delete all variables of “4 byte input“?
Signal: 	Do you really want to delete this connection?
Splitted Signal: 	Do you really want to delete this connection?

Table 6: Deleting Variable Subsets

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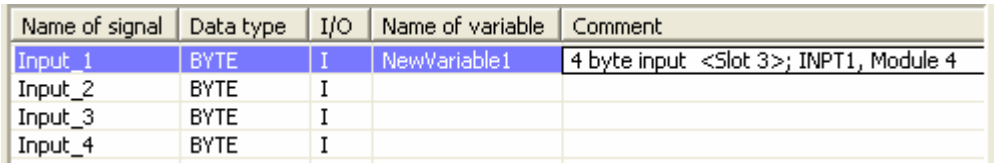
3.3 Editing Comment

The field **Comment** can be edited via mouse click.

By a double click into the column **Comment** or by selecting a cell in the column **Comment** or by pressing the F2 key and clicking the SPACE key activates the input box.



Name of signal	Data type	I/O	Name of variable	Comment
Input_1	BYTE	I	NewVariable1	4 byte input <Slot 3>; INPT1, Module 4
Input_2	BYTE	I		
Input_3	BYTE	I		
Input_4	BYTE	I		

Figure 13: Enter a Comment manually

In this field the standard comment including the name and the position description of the module can be completed or overwritten by an arbitrary text.

With **ENTER** and/or **TAB** key or with a focus change this entry is confirmed. This entry can be canceled with the **ESC** key when the entry is not confirmed yet.

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3.4 Find Signals

In the table of the bus configuration can be searched for signals.

The following dialogue opens by one click with the right mouse button in the table and selecting **Find Signal** from the context menu. Alternatively the **Find** dialog can be called up by the key combination **Ctrl.+F**.

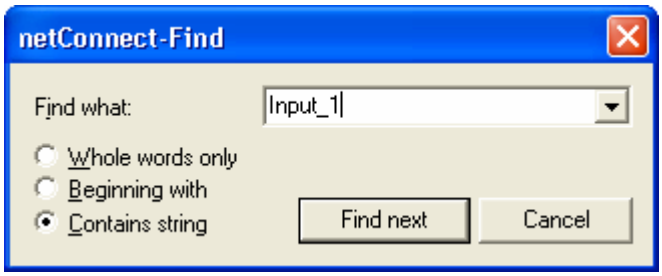

Figure 14: Find Signals

In the field **Find what** a signal name, the beginning of a signal name or a part of the signal name can be entered.

Note: The capitalization in the field **Find** is not relevantly.

With the option **Whole words only** it is searched for a signal name that matches the entered name.

With the option **Beginning with** it is searched for signals that begin with the entered name.

With the option **Contasins string** it is searched for signals which have the entered name at any position in the signal name (at the beginning, in the middle or at the end).

Further variables with this name and respectively with this initial letters can be indicated by clicking on the **Find next** button.

After indication of all signals, which are applicable, the following message appears:

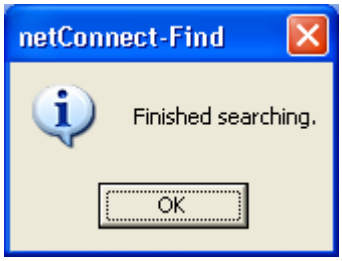

Figure 15: Search for signal terminated

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3.5 Sort Signals

Via the context menu and selection of the **Sort** function, it is possible to sort and indicate signals according to certain categories.

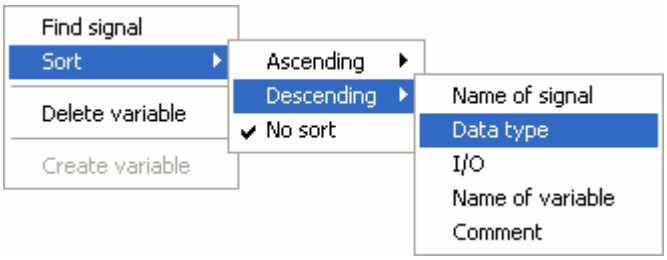

Figure 16: Sort Signals

The sorting of signals can be made according to the **Name of signal**, the **Data type**, input and/or output data (**I/O**), the **Name of Variable** or by the **Comment**.

Alternatively the arrangement of the signals also can be changed by clicking in the individual column headings of the table.

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3.6 Driver Parameter

With the **Driver Parameter** the **Board No.** of the Master device is adjusted.

To set the driver parameter at least one signal of this master system has to be connected.

The driver parameters are called via a right mouse click on the master system and then the selection of **Driver Parameter** from the opened context menu.

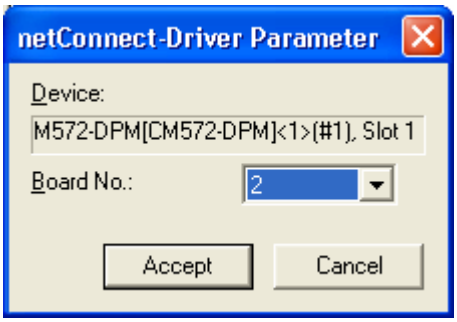

Figure 17: Driver parameter

Board No.:

With the selection field **Board No.** the board number of the installed hardware is set. The board numbers **0** to **6** are available.

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ABB STOTZ-KONTAKT GmbH
Eppelheimer Straße 82 69123 Heidelberg, Germany
Postfach 10 16 80 69006 Heidelberg, Germany
Telephone (06221) 701-0
Telefax (06221) 701-240
Internet http://www.abb.de/stotz-kontakt
E-Mail desst.helpline@de.abb.com